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DEPARTMENT OF THE NAVY
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HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

ENGINEERING EVALUATION/COST ANALYSIS
STORM DRAIN SYSTEM
FINAL

July 26, 1996

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ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or relevant and appropriate requirement
AWQC	Ambient water quality criteria
BAAQMP	Bay Area Air Quality Management Plan
BCP	Base cleanup plan
bgs	Below ground surface
BRAC	Base realignment and closure
CAMU	Corrective action management unit
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract laboratory program
COC	Chemical of concern
CMP	Corrugated metal pipe
CRC	Coastal Resources Coordination Branch
DCE	Dichloroethene
DIP	Ductile iron pipe
DTSC	Department of Toxic Substances Control
ECHOS	Environmental Cost Handling Options and Solutions
EE/CA	Engineering evaluation and cost analysis
EFA WEST	Engineering Field Activity West, Naval Facilities Engineering Command
EPA	U.S. Environmental Protection Agency
ER-L	Effects range - low
ER-M	Effects range - median
FS	Feasibility study
HDPE	High density polyethylene
HLA	Harding Lawson Associates
HPAL	Hunters Point Ambient Levels
HPS	Hunters Point Shipyard
IR	Installation Restoration
IWMB	Integrated Waste Management Board
LDR	Land disposal restrictions
MCLs	Maximum contaminant levels
μg/kg	Micrograms per kilogram
mg/kg	Milligram per kilogram
mg/L	Milligram per liter
mil	millimeter
msl	Mean sea level

EXECUTIVE SUMMARY

This engineering evaluation and cost analysis (EE/CA) report was prepared in accordance with current U.S. Environmental Protection Agency (EPA) and U.S. Navy guidance documents for a non-time critical removal action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). It summarizes the results of the EE/CA process, characterizes the site, identifies removal action objectives (RAOs), describes and analyzes removal action alternatives, and describes the recommended action alternative.

Hunter's Point Shipyard (HPS) has been operated as a shipyard since 1869 and produced Liberty ships during World War II. Other Navy ships were also modified, maintained, and repaired at HPS. Shipyard operations ceased in 1974, and the facility was placed in industrial reserve. From 1976 to 1986, Triple A Machine Shop leased most of HPS from the Navy and operated a commercial ship-repair service.

The existing storm drain system at HPS was originally constructed as a combined storm water and sanitary sewage collection system. The systems were initially separated in 1973; a follow-on separation project in 1976 changed the system to its current configuration. The storm drain and sanitary sewer system were considered separate at completion of these projects. A sampling survey was conducted on storm drain system sediments in 1994. Sampling data indicated the presence of widespread sediment contamination in manholes and catchbasins throughout HPS. Potential chemicals of concern in sediments included metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and pesticides and polychlorinated biphenyl compounds (PCBs).

CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Title 40 Code of Federal Regulations [40 CFR] Part 300) define removal actions as the cleanup or removal of released hazardous substances, actions to monitor the threat of release of hazardous substances, and actions to mitigate or prevent damage to public health or welfare or the environment. A removal action is planned to mitigate discharge of contaminated sediments and infiltrated groundwater to San Francisco Bay via the HPS storm drain system. The objective of the removal action is to mitigate risk posed by contaminated sediments that may release directly to the bay or may serve as a source of contaminants that could desorb when in contact with water flowing through the system. The removal action will be compatible with future remedial actions planned at HPS. To meet this objective, an EE/CA is conducted. This EE/CA first determined whether storm drain system contaminants pose an immediate threat to San Francisco Bay.

Sediment contaminant levels were compared to sediment screening criteria to evaluate whether contaminated sediments in the storm drain system pose a potential threat to aquatic habitat. The sediment screening criteria have been developed to indicate the level at which there is a potential for harmful impacts to aquatic habitat. If the highest contaminant concentrations in sediments are below applicable sediment screening criteria, aquatic habitat impacts are considered nonthreatening. If contaminant concentrations in sediments exceed sediment screening criteria, a potential impact exists and the removal action is justified. Concentrations of metals, SVOCs, and pesticides/PCBs in sediment samples collected from manholes and catch basins throughout HPS exceeded screening levels.

The EE/CA examines the implementability, effectiveness, and cost of various options to address contaminated sediments in the storm drain system and evaluates applicable regulatory requirements. Sediment removal was considered critical to mitigating the threat posed by potential sediment discharge to San Francisco Bay. This technology was therefore considered in conjunction with several options for managing the removed sediments. The options were compared with respect to effectiveness, implementability, and cost, and were then combined into overall removal action alternatives for the storm drain system. The selected removal action alternatives considered are:

Alternative 1:	Sediment removal, off-site disposal of hazardous sediments only
Alternative 2:	Sediment removal, off-site disposal of all sediments
Alternative 3:	Sediment removal, on-site management of all sediments
Alternative 4:	Sediment removal, on-site treatment of hazardous sediments

Based on analyses contained in this report, the Navy recommends Alternative 2. This alternative best meets the NCP criteria of overall protectiveness of human health, compliance with applicable or relevant and appropriate requirements (ARARs), long-term effectiveness, reduction of toxicity through treatment, short-term effectiveness, implementability, cost, and state and community acceptance.

Alternative 2 is the preferred option for the storm drain system removal action because it (1) will effectively remove the potential threat posed by movement of hazardous substances into the bay; (2) involves readily implementable technologies; (3) offers a high degree of reliability at a cost similar to the other alternatives evaluated.

ACRONYMS AND ABBREVIATIONS (Continued)

Navy	U.S. Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NGVD	National Geodedic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
OU	Operable unit
O&M	Operation and maintenance
PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
POTW	Publicly owned treatment works
ppb	Parts per billion
PPE	Personal protective equipment
ppm	Parts per million
PRC	PRC Environmental Management, Inc.
PRG	Preliminary remediation goal
RAO	Removal action objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial investigation
RWQCB	Regional Water Quality Control Board-San Francisco Bay Region
SACM	Superfund Accelerated Cleanup Model
SARA	Superfund Amendments and Reauthorization Act of 1986
STLC	Soluble threshold limit concentration
SVOC	Semivolatile organic compound
SWRCB	State Water Resources Control Board
TBC	To be considered
TCE	Trichloroethene
TPH	Total petroleum hydrocarbon
Triple A	Triple A Machine Shop
TSCA	Toxic substances control act
TTLC	Total threshold limit concentration
TU	Treatment unit
UST	Underground storage tank
VCP	Vitrified clay pipe
VOC	Volatile organic compound

Under Alternative 2, sediments will be removed from the storm drain system with a high pressure jet washer. Sediment slurry generated from the cleaning will be collected in rolloff containers and decanted. Liquid removed from the sediment will be reused, characterized, and disposed of appropriately; liquid will be disposed in the local POTW assuming it meets POTW pretreatment standards. The resulting solids will be characterized and hazardous sediments will be transported to a Class I landfill for treatment and disposal. Organic contaminants exceeding land disposal restrictions (LDRs) will be treated offsite before disposal. Nonhazardous sediments will be transported to a Class III landfill for disposal.

1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC), is evaluating four non-time critical removal actions for the U.S. Department of the Navy at Hunters Point Shipyard (HPS) in San Francisco, California. The removal actions include (1) the storm drain system; (2) soil and floating product in Parcel E; (3) groundwater plume in installation restoration site (IR)-1/21 of Parcel E; and (4) exploratory excavations. Groundwater removal actions are no longer being pursued in Parcels B and C. Groundwater in these parcels will be addressed in the remedial investigation and feasibility study (RI/FS) process. The groundwater removal action documentation at Site IR-1/21 in Parcel E is being completed concurrently with this project. This engineering evaluation and cost analysis (EE/CA) identifies removal action sediment screening criteria and evaluates removal action alternatives for the storm drain system.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) define removal actions to include "the cleanup or removal of released hazardous substances from the environment, such actions as may necessarily be taken in the event of the threat of release of hazardous substance into the environment, such action as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release." The U.S. Environmental Protection Agency (EPA) has classified removal actions into three types based on the circumstance surrounding the release or threat of release: emergency, time critical, and non-time critical. The storm drain response actions at HPS have been determined to be non-time critical since the contaminated storm drain sediments and infiltrated groundwater do not pose an immediate threat to human health and the environment. On-site action will therefore start more than 6 months after the planning period begins.

This storm drain removal action focuses on one pathway that may contribute to unsafe discharges to the San Francisco Bay. Contaminated sediments accumulated within the storm drain system lines may discharge directly to the bay or provide a source for contaminants that will desorb when in contact with water flowing through the system.

HPS includes approximately 107,000 linear feet of storm drain line and numerous manholes and catch basins. Sediment contamination within the storm drain system has been identified in a previous investigation (HLA 1994). The contamination varies from catch basin to catch basin but generally includes volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), and pesticides. The sources of contamination are assumed to be various previous industrial activities throughout the base. Metals have also been detected but may originate in native underlying serpentine rock and other native soil material.

This EE/CA addresses the implementability, effectiveness, and cost of a sediment response action and evaluates applicable regulatory requirements. This EE/CA will be used as the basis for a future CERCLA removal action. The Navy is the lead agency for this removal action. As the lead agency, the Navy has final approval authority for the recommended alternative selected and overall public participation activities. The Navy is cooperating with EPA, the California Department of Toxic Substances Control (DTSC), and the Regional Water Quality Control Board (RWQCB) in implementing these removal actions.

The EE/CA report is intended to:

- Summarize and evaluate current knowledge of the extent of contaminated sediment in the HPS storm drain system
- Identify and evaluate potential removal action alternatives
- Provide a basis for selecting a removal action alternative
- Satisfy administrative record requirements for documenting the removal action alternative

The report has nine sections and three supporting appendices. This introduction explains the purpose and framework of this removal action. Section 2.0 presents site characterization information for HPS; Section 3.0 contains a streamlined risk assessment and identifies chemicals of concern (COCs). Section 4.0 discusses the removal action objectives. Section 5.0 screens and evaluates sediment removal action options, Section 6.0 identifies storm drain removal action alternatives, and Section 7.0 compares the removals action alternatives. Section 8.0 discusses the recommended removal action alternative. References used to prepare this EE/CA report are listed in the final section. Appendix A summarizes sediment data, Appendix B presents cost opinion details for each removal action alternative, and Appendix C contains response to comments.

1.1 REMOVAL ACTION APPROACH

The focus of this removal action is to reduce the potential for hazardous substances to migrate into San Francisco Bay via the storm drain system. A storm water pollution prevention plan in place at

HPS addresses contributions of surface discharges to the storm drain system. This EE/CA focuses on potential subsurface contaminant sources, specifically, contaminated sediment accumulated within the system. Chemical concentrations detected in sediment samples taken from the storm drain system are evaluated to determine whether the contaminated sediment infiltration poses an immediate threat to San Francisco Bay.

To evaluate whether unsafe levels of contamination may be migrating into the bay, maximum sediment contaminant levels detected in samples from 68 catch basins and manholes (HLA 1994) are compared to sediment screening criteria. The sediment screening criteria were developed for the protection of aquatic life in surface water, and are used for purposes of a streamlined risk assessment in this EE/CA to evaluate potential impacts to environmental receptors.

The National Oceanic and Atmospheric Administration (NOAA) Coastal Resources Coordination (CRC) branch identifies potential impacts to coastal resources and habitats likely to be affected by waste sites. For sediment, NOAA developed effects range-low (ER-L) and effects range-median (ER-M) concentration levels for soil and sediment screening. The ER-Ls and ER-Ms were developed by comparing contaminant levels in soils to average concentrations found in natural soils of the United States (NOAA 1994).

The sediment screening criteria were developed to evaluate the potential for harmful impacts to the environment and justify the initiation of a removal action at a site. If maximum detected concentrations in sediment samples were below sediment screening criteria, environmental impacts are considered nonthreatening. A potential impact exists if sediment contaminant concentrations exceed the ER-L, ER-M, or background concentrations (for metals). The data screening is discussed further in Section 3.3.

1.2 REMOVAL ACTION RATIONALE AND STATUTORY FRAMEWORK

The scope and content of this EE/CA are consistent with EPA "Guidance on Conducting Non-Time-Critical Removal Actions under CERCLA" (EPA 1993) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Title 40 of the Code of Federal Regulations Part 300 [40 CFR Part 300]).

The sediment removal action will be conducted in accordance with requirements of CERCLA; the Superfund Amendments and Reauthorization Act of 1986 (SARA); and the NCP. CERCLA response actions are appropriate at sites with releases of (1) hazardous substances, or (2) pollutants or contaminants that present an imminent and substantial endangerment. This EE/CA uses constituent-specific screening criteria to evaluate whether the removal action is warranted.

Under Presidential Executive Orders 12580 and 12080, federal agencies have been delegated the authority to conduct and finance removals at federal facilities under their jurisdiction. Under the NCP, the lead agency is authorized to take any appropriate removal action to prevent, minimize, stabilize, mitigate, or eliminate the release or threat of release of hazardous substances, pollutants, or contaminants that constitute a threat to public health, welfare, or the environment. The Navy is the lead agency for CERCLA activities at HPS. The Navy has determined that a removal action is warranted at HPS based on removal action factors in the NCP and conditions at the HPS sites. Section 300.415(b)(2) of the NCP lists eight factors used to determine the appropriateness of a removal action. The following two factors indicate that a removal action is warranted based on the screening process applied to analytical data at HPS:

- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants

- High levels of hazardous substances or pollutants or contaminants in sediments and infiltrating groundwater that may migrate

Removal actions under the NCP provide an effective tool in responding to the overriding mandate of CERCLA to protect public health, welfare, and the environment. Consistent with the Superfund Accelerated Cleanup Model (SACM), which stresses integrating removal and remedial responses, these removal actions are intended to be easily integrated into the final action for the storm drain system, if required.

EPA has developed guidance and policies for removal actions. CERCLA 120(a)(2) prohibits adopting any policies inconsistent with EPA guidelines and rules. It is therefore Navy policy that response actions follow EPA guidance to determine the reasonableness of applicable regulations. In addition, the Navy is working in cooperation with EPA, DTSC, and RWQCB in implementing this removal action.

EPA has classified removal actions into three types based on circumstances surrounding the release or threat of release: emergency, time-critical, and non-time critical. The Navy determined that the storm drain removal actions at HPS are non-time critical because the sediments and contaminated groundwater infiltration do not pose an immediate threat to public health, welfare, or the environment; therefore, a planning period of 6 or more months is available. Under the NCP, the Navy, as lead agency, must conduct an EE/CA for all non-time critical removal actions at HPS.

This EE/CA report will be issued in accordance with the community relations plan prepared by the Navy and dated January 20, 1989 (HLA 1989) to facilitate public involvement in the decision making process. The community relations plan encourages the public to review and comment on the recommended removal action described in the EE/CA report. To gain a more thorough understanding of the activities associated with this removal action, the plan also encourages the public to review the administrative record available at Engineering Field Activity West (EFA WEST) offices in San Bruno, California, and the information repository located at the main San Francisco public library on Larkin and McAllister Streets and the Bayview branch library located on Third Street.

2.0 SITE CHARACTERIZATION

HPS is in southeastern San Francisco at the tip of a peninsula extending into San Francisco Bay (see Figure 1). The Navy property encompasses 936 acres, 493 of which are on land and 443 of which are below waters of the bay. About 70 to 80 percent of HPS consists of relatively flat lowlands constructed on artificially filled mudflats. A moderately sloping ridge in the northwestern portion of the site occupies the remaining HPS area. The northern and eastern shores of HPS were developed for ship repair and are equipped with drydock and berthing facilities. Currently, the Navy and private businesses use HPS for limited commercial and light industrial activities.

HPS has been divided into five parcels of land, Parcels A through E, plus an additional Parcel F, which includes the subtidal lands.

This section discusses (1) the history of HPS, (2) the HPS installation mission, (3) the environmental setting at HPS, (4) storm drain system description and history, (5) previous removal activities, (6) previous storm drain investigations, and (7) the source, nature, and extent of hazardous substances. Information presented in this section was derived from the Draft Final Parcel A Remedial Investigation Report (PRC 1995b) and the HPS hydrogeologic report (PRC 1994a). In addition, information presented in Section 2.3.7 was derived from the Phase 1A Ecological Risk Assessment Report (PRC 1994b).

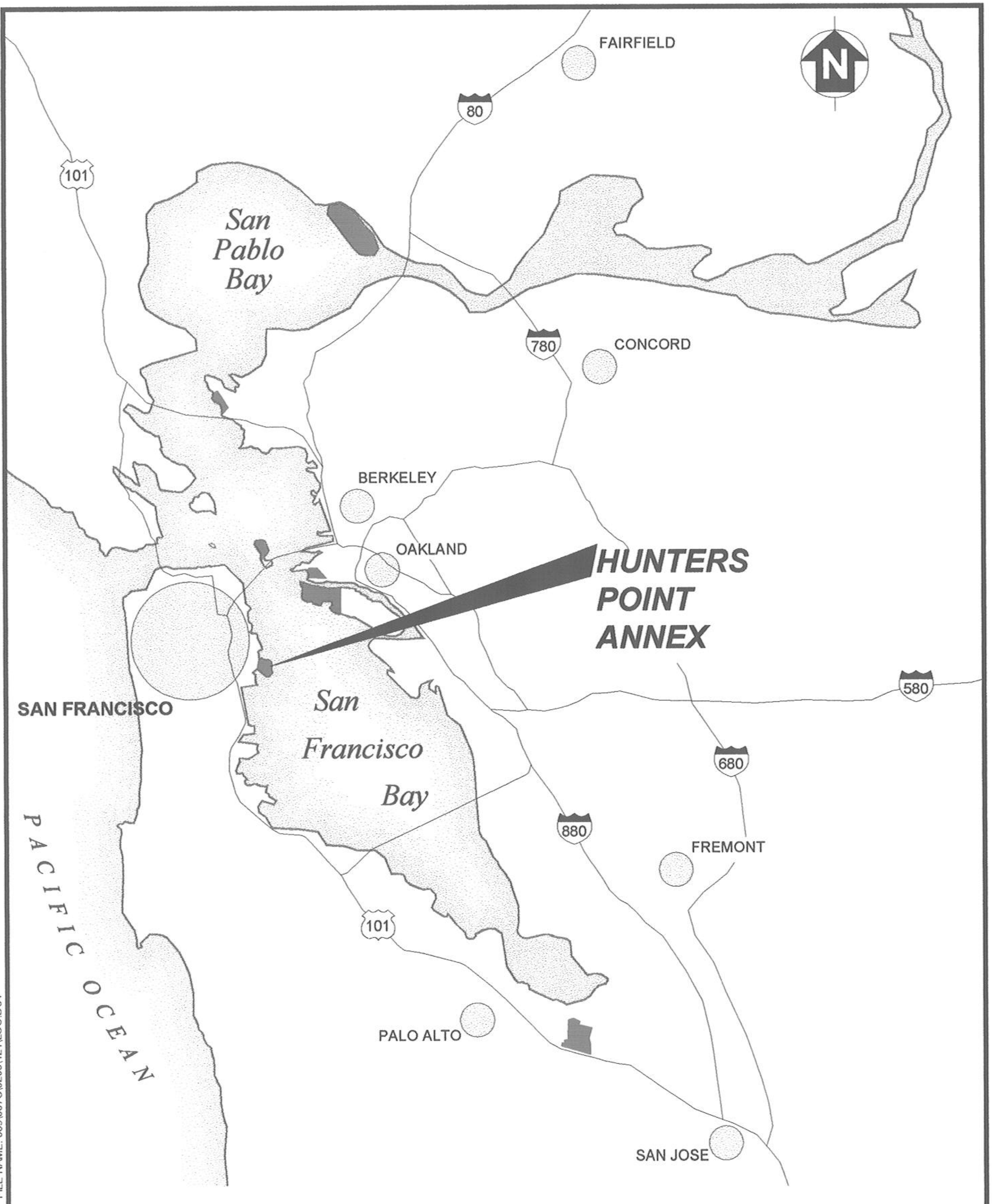

FIGURE 1
HUNTERS POINT ANNEX
FACILITY LOCATION MAP

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2.1 HPS HISTORY

The promontory on which HPS is located has been recorded in maritime history since 1776, first as Spanish mission lands used for cattle grazing and later for its drydock facilities. HPS's history is discussed below focusing on the time period from 1939, when Congress passed legislation to acquire the land (PRC 1995b), to the present (after Navy acquisition).

In 1940, the U.S. Government received title to the land at Hunters Point and began development. Of the property acquired, Dry Docks No. 2 and 3, two pump houses, a boiler house, a gate house, and a paint storage building still exist and form a historic district. From 1945 to 1974, the shipyard was predominantly used as a repair facility by the Navy. Additional acreage, mostly on the southern side of the base, was acquired in 1957, increasing the size of the facility. The Navy operated the shipyard as a carrier and ship repair facility through the late 1960s. Hunters Point was deactivated in 1974 and remained relatively unused until 1976.

In 1976, the Navy leased 98 percent of Hunters Point to a private ship repair company, Triple A Machine Shop. Triple A leased the property from July 1, 1976, to June 30, 1986, but did not vacate the property until March 1987. During the lease period, Triple A used dry docks, berths, machine shops, power plants, various offices, and warehouses to repair commercial and Naval vessels. Triple A also subleased portions of the property to various other businesses.

In 1986, the Navy resumed occupancy of Hunters Point. Many of the subtenants under Triple A's lease remained tenants under the Navy's subsequent reoccupancy in 1986. From November 1985 to August 1989, several Navy surface ships were docked at the property.

The Hunters Point property was placed on the National Priorities List in 1989 as a Superfund site pursuant to CERCLA because of the presence of hazardous materials from past shipyard operations. The Hunters Point Naval Shipyard then came under the administrative jurisdiction of Treasure Island Naval Station in 1990 and was named Hunters Point Annex. From April 1990 to March 1994, Hunters Point Naval Shipyard was an annex of Treasure Island Naval Station.

In 1991, HPS was slated for closure pursuant to the Defense Base Realignment and Closure Act of 1990 (Public Law 101-510). Closure activities at HPS involve environmental remediation and making the property available for nondefense use. On March 31, 1994, control of HPS was transferred from Treasure Island Naval Station to the Naval Facilities Engineering Command, Western Division in San Bruno, California (now EFA WEST).

2.2 HPS INSTALLATION MISSION

HPS was primarily used for the industrial modification, maintenance, and repair of ships. The mission of the shipyard before it was decommissioned in 1974 was to provide logistical support for assigned ships and service craft; to perform authorized work in connection with the construction, conversion, overhaul, repair, alteration, drydocking, and outfitting of ships and craft, as assigned by the Navy; to conduct research, development, and test work, as assigned by the Navy; and to provide services and materials for other activities and to other units as directed by a competent authority.

2.3 HPS ENVIRONMENTAL SETTING

This section summarizes HPS's climate and meteorology, surface features and topography, surface water drainage, geology, soils, hydrogeology, and ecology.

2.3.1 Climate and Meteorology

The climate at HPS is characterized by partly cloudy, cool summers with little precipitation and mostly clear, mild winters with rainstorms. The average annual precipitation is about 19 inches. Air monitoring conducted at HPS indicates that the prevailing wind direction is west to east; therefore, airborne dust and volatile emissions would probably be transported primarily off shore to the east-southeast. The average and maximum wind speeds at HPS are approximately 5 and 10 meters per second, respectively.

2.3.2 Surface Features and Topography

About 70 to 80 percent of HPS consists of relatively level lowlands (comprising Parcels B, C, D, and E) constructed by excavating portions of the Hunters Point ridge and placing fill materials along the San Francisco Bay margin. The remaining land consists of much of Parcel A and is a moderately to steeply sloping ridge in the northwest portion of HPS. Most of the lowlands are covered with asphalt, buildings, or other structures. The uplands are covered with asphalt, buildings, and vegetation. Elevations range from 0 to 18 feet above mean sea level (msl) in the lowlands to 180 feet above msl at the ridge crest in Parcel A.

2.3.3 Surface Water Drainage

Surface water drainage at HPS appears to primarily consist of sheet-flow runoff that collects in the on-site storm drain system and discharges through the storm drain system into San Francisco Bay through several outfalls. Locally, some surface water runoff may enter catch basins connected to the sanitary sewer system. Ultimately, surface water runoff that enters the HPS sanitary sewer discharges to the city of San Francisco sanitary sewer system. No naturally occurring channelized drainage exists. All pre-existing drainage channels have been filled or modified by construction over the years.

2.3.4 Geology

Six geologic units underlie HPS, the youngest of Quaternary age and the oldest of Jurassic-Cretaceous age. In general, the stratigraphic sequence of these units, from top to bottom, is as follows: artificial fill; slope debris and ravine fill; undifferentiated upper sand deposits; bay mud deposits; undifferentiated sedimentary deposits; and Franciscan Assemblage bedrock. The peninsula forming HPS is within a northwest trending belt of Franciscan Assemblage bedrock known as the Hunters Point Shear Zone. The rocks within this zone are intensely deformed and sheared. Serpentinite, is the predominant rock type, but other rock types characteristic of Franciscan Assemblage bedrock are also present.

Serpentinite is subdivided into two general textural types: a relatively hard serpentinite and intensely sheared, friable, and weak to plastic serpentinite. Stronger and more brittle rock types, such as graywacke and hard serpentinite, have very low primary porosity and permeability; however, some secondary porosity and permeability result from the presence of open fractures. Surrounding the brittle rock types, sheared serpentinite and shales form a matrix of relatively fine-grained rocks with low porosity and permeability. Serpentinite in this area is known to contain several metals within its matrix.

2.3.5 Soils

Three soil surveys have been conducted by the U.S. Department of Agriculture in the San Francisco area and include HPS. In general, soils at HPS are derived from underlying rocks and weathered material or were imported as fill. Parcels B through E are primarily covered by bottomland soils. Bottomland soils exist in areas that were once part of San Francisco Bay and adjacent tidal flats. The properties and characteristics of these soils are highly variable because of differences in the type and amount of fill material used. Some areas have a permanent water table at a depth of 30 to 60 inches below ground surface (bgs) because of fluctuating tides. Surface water runoff over bottomland soils is slow, and water-erosion is low.

2.3.6 Hydrogeology

Three distinct water bearing formations have been identified at HPS and are designated the A-aquifer; the undifferentiated sedimentary aquifer, or B-aquifer; and water in localized fractures of bedrock. The A-aquifer consists of saturated fill materials and undifferentiated upper sand deposits overlying bay mud. The A-aquifer may overlie bedrock in excavated areas next to the former shoreline. In the lowland areas of HPS, depths to groundwater range from 2 to 15 feet bgs. The B-aquifer consists of undifferentiated sedimentary deposits underlying bay mud and overlying Franciscan Assemblage bedrock. The bedrock aquifer consists of the upper weathered and deeper fractured portions of the Franciscan bedrock. The bedrock aquifer appears to be in direct hydraulic communication with the A-aquifer where the A-aquifer directly overlies it.

2.3.7 Ecology

The ecology of HPS includes aquatic environments, limited terrestrial areas, and transition (wetlands) zones, all of which have been physically disturbed by human activities, such as dredging, excavation, filling, and land development. The aquatic environment includes the intertidal zone and subtidal areas surrounding HPS. Terrestrial habitat is present at Parcel A in the upper residential hill area, Parcel E in the fill area and the landfill, and on a limited basis in Parcel B. Pockets of salt marshes are located along the southern shore of HPS in Parcel E.

The intertidal zones provide foraging habitat for migratory and resident shorebirds. Approximately 50 different species of fish have been reported in surveys conducted in water near HPS by the

California Department of Fish and Game between 1980 and 1985. The species assemblage is typical of harbor or marina settings and does not reveal the existence of any rare or endangered species.

Most of HPS's terrestrial habitat is currently covered with asphalt, buildings, or other structures. The vegetated areas of HPS comprise four distinct terrestrial habitats. In order of decreasing area, these habitats include ruderal (disturbed), landscaped, nonnative grassland, and salt marsh areas. Almost all of the terrestrial habitat of potential ecological concern is located in Parcel A; however, Parcel E contains ruderal habitats and salt marshes.

The ruderal habitat consists of aggressive colonial plant species. The habitat is dominated by serpentinite minerals and associated soils that contain elevated levels of naturally occurring heavy metals such as nickel and chromium. The heavy metal content of the serpentinite-derived soils restricts the variety of plants growing in this habitat to species that can tolerate and adapt to the xenobiotic metals.

The Navy conducted a wetlands delineation of HPS in July 1991. Salt marsh habitats were identified along the bay margin at Parcel E. The vegetation of the salt marshes provides habitat for migratory and resident shorebirds. In addition, the vegetation provides suitable habitat for the salt marsh harvest mouse, which is classified as both a federal and California endangered species.

2.4 STORM DRAIN SYSTEM DESCRIPTION AND HISTORY

This section summarizes HPS's storm drain system description and history as related to the sediment and contaminated groundwater infiltration removal actions. The sources of the information contained in this section are a utilities study report completed by YEI Engineers, Inc. (YEI 1988), a memorandum report prepared by Harding Lawson Associates (HLA 1994) and PRC's field observations.

2.4.1 Description

HPS includes, by one estimate, approximately 107,000 linear feet of storm drain line varying in size from 2 to 72 inches in diameter, and 538 catchbasins (HLA 1994). Others have estimated that there are approximately 624 catchbasins and 321 manholes (PRC 1996b). The exact number of catchbasins and total length of storm drain are unknown. Approximately one-sixth of the catch basins are dry wells (Gahagan and Brant 1994), all of which contain sediment of varying amounts. The general configuration of the storm drain system is shown in Figure 2.

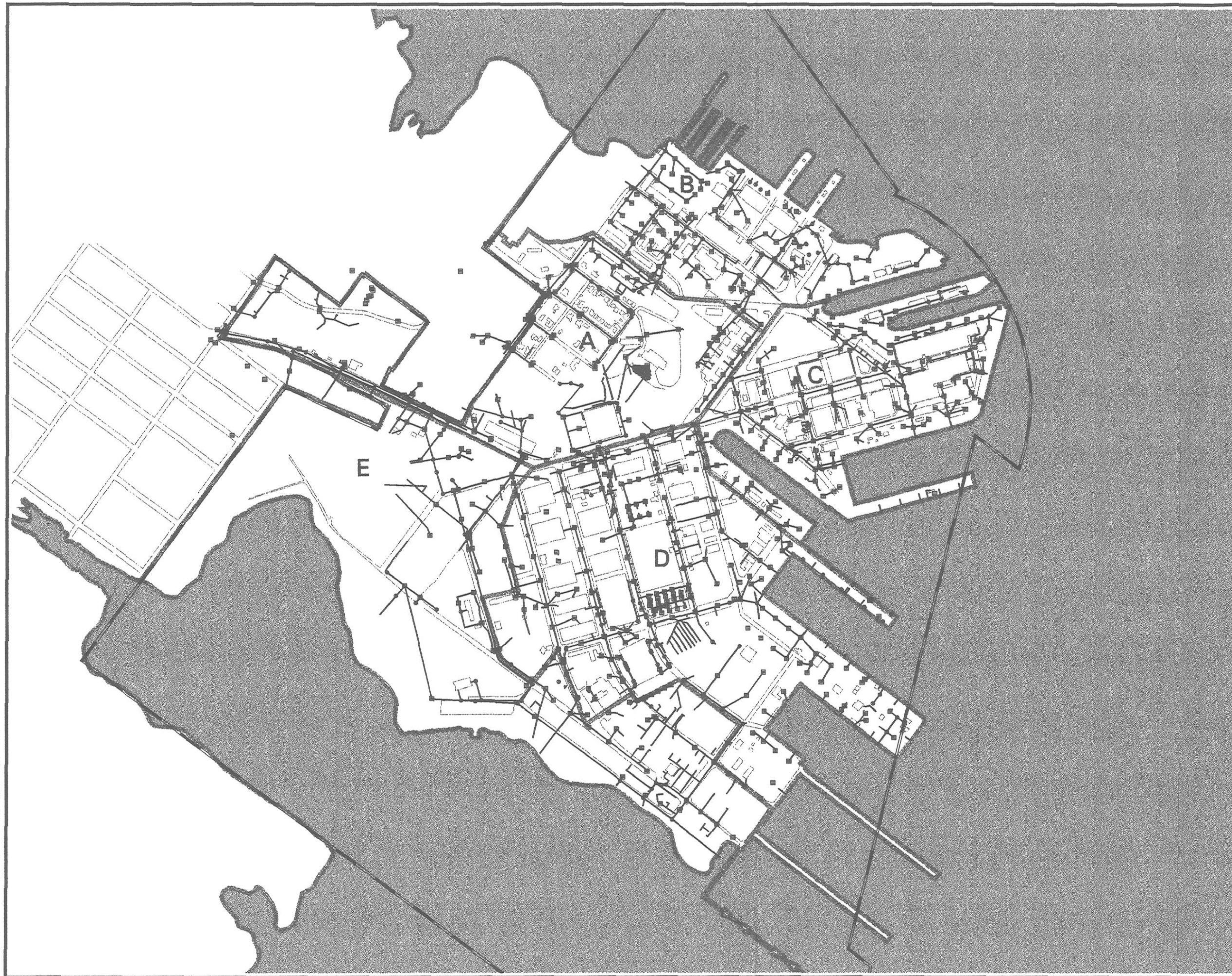

FIGURE 2
HUNTERS POINT ANNEX
SAN FRANCISCO, CALIFORNIA
STORM DRAIN EE/CA
STORM DRAIN SYSTEM

/data0/hunters/amis/bypt2.map PRR
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Dry wells are catchbasins with sediment storage capacity constructed below the invert of the outlet pipe. They may also have permeable (for example, gravel) bottoms to allow for percolation into the underlying soils.

The system discharges to the San Francisco Bay through 33 documented outfalls ranging from 6 to 72 inches in diameter. Many different piping materials were used throughout the construction of the storm drain system, including vitrified clay pipe (VCP), corrugated metal pipe (CMP), steel pipe, concrete pipe, and ductile iron pipe (DIP). The manholes and catch basins also vary in size, shape, and materials of construction. Many of the older manholes and catch basins are constructed of brick and mortar, while the newer are constructed of precast concrete sections. The manhole and catch basin vaults vary in depth from 1 foot to more than 10 feet. While most of the vault covers are circular, the vaults themselves are circular, rectangular, or square.

2.4.2 History

The existing storm drain system was originally designed and constructed as a combined storm water and sanitary sewage collection system. The system grew and evolved as need directed, with new sections added as the base developed. The system as a whole is composed of 10 independent drainage systems with many minor drainage systems along the shoreline and pier areas. The major drainage basins were designated in alphabetical order from "A" to "J" (YEI 1988). To eliminate the potential for confusion between the drainage basins and the parcels, the drainage basins have been redesignated as roman numerals I through X for this EE/CA.

The majority of the combined storm and sanitary sewer system was constructed between 1942 and 1946. Significant modifications to the system occurred in 1958 with a partial separation of the sanitary sewer from the storm drain system, and the addition of a lift station for the sanitary system. In 1973, a major separation of the systems was undertaken. The separation included construction of the entire drain system in drainage basin I including the 72-inch outfall. Separation construction activities for this project were completed in 1975. A follow-on separation project concentrating on drainage basin II was completed in 1976, changing the system to its current configuration. No other projects have modified the system since that time. All known interconnections between the storm drain and sanitary sewer systems were corrected under the Navy's Storm Water Program (any interconnections found in the future will be corrected) (EFA West 1996).

2.4.3 Existing Conditions and Function

The current condition of the HPS storm drain system varies from good to very poor and exhibits many of the characteristics of an aging system. Broken and leaky pipes and joints are common throughout the system. Because a large portion of the system was constructed on non-engineered fill, seismic activity and typical fill consolidation have caused significant differential settlement of many storm drain lines. This differential settlement has resulted in slope reversal as well as low spots located throughout the system. The low spots and slope reversals have further added to system degradation by allowing deposition of solids.

Inoperable tidal gates create hydraulic barriers at several locations. Since many of the outfalls do not have tidal gates and the ones that do are frozen in a nearly closed position, the system is tidally influenced with localized tidal flooding in areas where the ground surface elevation is lower than 106.9 feet NGVD, the mean higher high tide elevation.

The function of the system is limited further by sedimentation present in the majority of catch basins and manholes. In many locations, catch basins are nearly or completely filled with sediment, rendering them useless. There was an estimated 1,845 cubic yards of sediment in the catch basins and manholes in Parcels A, B, C, D, and E. However, sediment in Parcel A catch basins, manholes, and trunk lines was cleaned out in 1994 (HLA 1994).

Despite the condition and functional limitations of the storm drain system, it appears that it has operated adequately within the narrow limits of its design storm capacity. The majority of the system has a 2-year storm design capacity (YEI 1988). Since HPS is now only occupied by a few private industrial tenants, periodic and localized flooding does not warrant the expense of system upgrades. Furthermore, HPS will eventually be transferred from the Navy to the city and county of San Francisco for redevelopment. Redevelopment needs may require reconfiguration of the storm drain system.

2.5 PREVIOUS HPS REMOVAL AND REMEDIAL ACTIONS

Previous removal and remedial actions at HPS provide valuable information about feasible technologies, the nature and extent of contaminants treated and controlled, and lessons learned. Some previous removal and remedial actions conducted at HPS (PRC 1995a) include:

- PCB cleanup at IR-8 — PCB-contaminated soils discovered at IR-8 were excavated and disposed of off site.

- Tank S-505 — Tank S-505 was decontaminated and demolished and a small amount of the affected soil beneath it excavated and disposed of off site.

- Underground Storage Tank (UST) Removals — Approximately 160 tons of soil associated with underground storage tanks (USTs) throughout HPS have been excavated and disposed of at a Class I landfill in California.

- Pickling and Plating Yard Removal Action — This removal action is ongoing and consists of decontamination of all surfaces and removal of hazardous material.

- Parcel A Storm Drain System Cleaning (part of an operation and maintenance task) — Sediments from storm drain catch basins, manholes, and lines in Parcel A were removed.

The storm drain system associated with Parcel A is not considered in this EE/CA since the IR sites in Parcel A have been remediated and the storm drain catch basins, manholes, and lines have been cleaned.

2.6 PREVIOUS STORM DRAIN INVESTIGATIONS

Although several studies and surveys provide information regarding system development, operation, location, and pollution prevention during periods of storm water runoff, only two studies relate to sediment, sediment contamination, and groundwater infiltration.

A study was conducted by Harding Lawson Associates (HLA) in 1994 where sediments were sampled at 78 different locations throughout the HPS storm drain system (HLA 1994). The results of this study are summarized in Section 2.7 of this report.

PRC conducted a study in 1995 and 1996 to assess the nature and extent of infiltration of contaminated groundwater into the storm drain system.

2.7 SOURCE, NATURE, AND EXTENT OF CONTAMINATION

This EE/CA has been prepared to evaluate contaminated sediments accumulated in the storm drain system. Sediments have the potential to discharge to San Francisco Bay. Discussions in this section focus on contaminants found in sediment at various sampling locations located throughout the storm drain system.

Sediment samples have been collected and analyzed from 78 different catchbasins and manholes located throughout the HPS storm drain system (HLA 1994). Ten of these sample locations were located in Parcel A. The sediments in Parcel A storm drain lines have subsequently been removed. The remaining sample locations are shown on Figure 3 along with drainage basin and parcel delineations. Data associated with these remaining sampling locations appear in Appendix A of this report. The data in Appendix A are organized by parcel in numeric order. Generally, metals, VOCs, SVOCs, Pesticides/PCBs, and TPH were detected in samples collected throughout the storm drain system. Table 1 shows the distribution of detections in these analyte groups by sampling station, drainage basin, and parcel. Maximum values in the data set for particular analytes are summarized in Table 2. Data provided by HLA indicate that up to 90 percent of the sediments may reside in the lines (HLA 1994).

3.0 STREAMLINED RISK EVALUATION

This streamlined risk evaluation used in support of removal actions for contaminated sediments entering the HPS storm drain system is limited in scope and is based on use of screening criteria developed to protect aquatic life. According to EPA guidance on conducting non-time critical removal actions, when "standards for one or more contaminants in a given medium are clearly exceeded, a removal action is generally warranted, and further quantitative assessment that considers all chemicals, their potential additive effects, or additivity of multiple exposure pathways, are generally not necessary" (EPA 1993). Potential risks associated with contamination in storm drain sediments and infiltrating groundwater are assessed by evaluating potential exposure routes and comparing contaminant concentrations to accepted screening criteria.

This EE/CA has been prepared to address sediments in the storm drain system that is discharging to San Francisco Bay. Section 3.1 discusses the potential for human exposure to contaminated sediment discharges to the bay. Section 3.2 discusses potential environmental impacts from contaminated sediments in the storm drain system that may be discharged to the bay. Section 3.3 identifies COCs and storm drain lines of concern based on comparison of contaminant concentrations to sediment screening criteria.

3.1 POTENTIAL FOR HUMAN EXPOSURE

This section addresses potential pathways for human exposure to contaminants of concern via sediments.

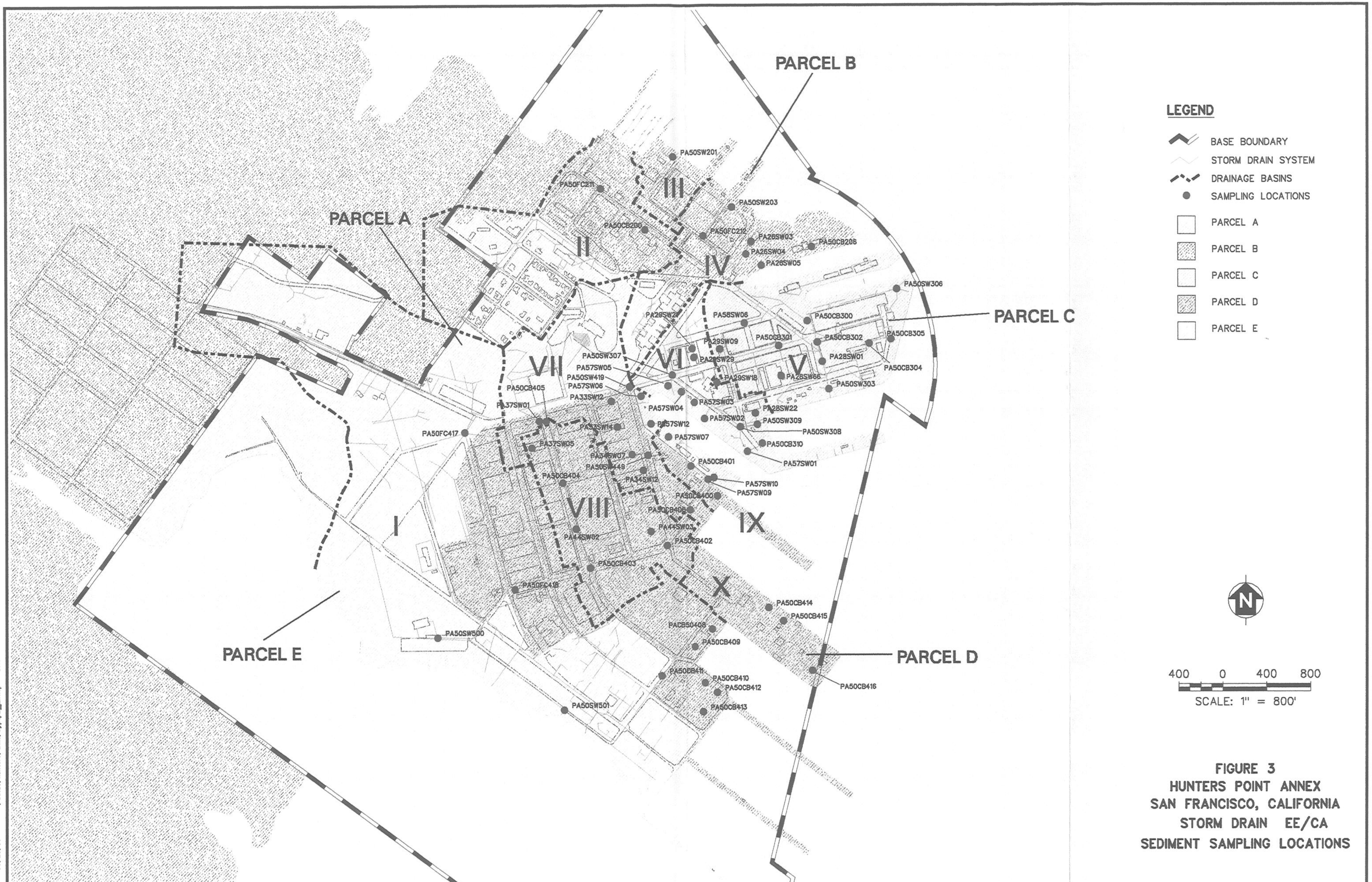

FIGURE 3
HUNTERS POINT ANNEX
SAN FRANCISCO, CALIFORNIA
STORM DRAIN EE/CA
SEDIMENT SAMPLING LOCATIONS

TABLE 1

HUNTERS POINT ANNEX
SEDIMENT QUALITY DATA
ANALYTE GROUP DETECTIONS

Drainage	Parcel	Station	Analyte Groups				
I	D	PA50CB413	*Metals*			Pest/PCB	TPH
I	D	PA50CB412	*Metals*		SVOCs	Pest/PCB	TPH
I	D	PA50CB411	*Metals*			Pest/PCB	TPH
I	D	PA50CB418	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
I	D	PA50CB409	*Metals*			Pest/PCB	TPH
I	D	PA50CB408	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
I	D	PA50CB410	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
I	E	PA50SW501	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
I	E	PA50SW500	*Metals*		SVOCs	Pest/PCB	TPH
I	E	PA50FC417	*Metals*		SVOCs	Pest/PCB	TPH
II	B	PA50FC211	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
II	B	PA50CB200	*Metals*	VOCs		Pest/PCB	TPH
III	B	PA50SW201	*Metals*			Pest/PCB	TPH
IV	B	PA26SW05	*Metals*		SVOCs	Pest/PCB	TPH
IV	B	PA26SW04	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
IV	B	PA26SW03	*Metals*		SVOCs	Pest/PCB	TPH
IV	B	PA50FC212	*Metals*			Pest/PCB	TPH
IV	B	PA50CB206	*Metals*		SVOCs	Pest/PCB	TPH
IV	B	PA50SW203	*Metals*		SVOCs		
V	C	PA50SW303	*Metals*	VOCs		Pest/PCB	TPH
V	C	PA50SW306	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
V	C	PA58SW06	*Metals*	VOCs	SVOCs	Pest/PCB	TPH

TABLE 1 (Continued)

HUNTERS POINT ANNEX
SEDIMENT QUALITY DATA
ANALYTE GROUP DETECTIONS

Drainage	Parcel	Station	Analyte Groups				
V	C	PA28SW01	*Metals*			Pest/PCB	TPH
V	C	PA50CB300	*Metals*		SVOCs	Pest/PCB	TPH
V	C	PA50CB301	*Metals*	VOCs	SVOCs		TPH
V	C	PA29SW18	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
V	C	PA29SW09	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
V	C	PA28SW66	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
V	C	PA50CB302	*Metals*			Pest/PCB	TPH
V	C	PA50CB305	*Metals*	VOCs		Pest/PCB	TPH
V	C	PA50CB304	*Metals*	VOCs		Pest/PCB	TPH
VI	C	PA50CB310	*Metals*	VOCs		Pest/PCB	TPH
VI	C	PA29SW29	*Metals*		SVOCs		TPH
VI	C	PA29SW21	*Metals*		SVOCs		TPH
VI	C	PA50SW308	*Metals*	VOCs		Pest/PCB	TPH
VI	C	PA50SW309	*Metals*	VOCs			TPH
VI	C	PA50SW307	*Metals*	VOCs		Pest/PCB	TPH
VI	C	PA28SW22	*Metals*	VOCs	SVOCs		TPH
VI	D	PA57SW03	*Metals*		SVOCs	Pest/PCB	TPH
VI	D	PA57SW05	*Metals*			Pest/PCB	TPH
VI	D	PA57SW02	*Metals*			Pest/PCB	TPH
VI	D	PA57SW01	*Metals*		SVOCs	Pest/PCB	TPH

TABLE 1 (Continued)

HUNTERS POINT ANNEX
SEDIMENT QUALITY DATA
ANALYTE GROUP DETECTIONS

Drainage	Parcel	Station	Analyte Groups				
VII	D	PA57SW06	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
VII	D	PA57SW12	*Metals*			Pest/PCB	TPH
VII	D	PA57SW04	*Metals*		SVOCs	Pest/PCB	TPH
VII	D	PA50SW419	*Metals*			Pest/PCB	TPH
VII	D	PA34SW10	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
VII	D	PA34SW07	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
VII	D	PA37SW01	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
VII	D	PA34SW12	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
VI	D	PA50CB405	*Metals*	VOCs		Pest/PCB	TPH
VII	D	PA50CB406	*Metals*	VOCs		Pest/PCB	TPH
VII	D	PA33SW14	*Metals*	VOCs		Pest/PCB	TPH
VII	D	PA33SW12	*Metals*			Pest/PCB	TPH
VIII	D	PA44SW02	*Metals*			Pest/PCB	TPH
VIII	D	PA37SW05	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
VIII	D	PA44SW03	*Metals*		SVOCs	Pest/PCB	TPH
VIII	D	PA50CB402	*Metals*		SVOCs		TPH
VIII	D	PA50CB403	*Metals*	VOCs	SVOCs	Pest/PCB	TPH
VIII	D	PA50CB404	*Metals*			Pest/PCB	TPH
IX	D	PA57SW09	*Metals*			Pest/PCB	TPH
IX	D	PA57SW10	*Metals*		SVOCs	Pest/PCB	TPH
IX	D	PA50CB401	*Metals*		SVOCs	Pest/PCB	TPH
IX	D	PA50CB400	*Metals*		SVOCs	Pest/PCB	TPH
IX	D	PA57SW07	*Metals*		SVOCs	Pest/PCB	TPH

TABLE 1 (Continued)

HUNTERS POINT ANNEX
SEDIMENT QUALITY DATA
ANALYTE GROUP DETECTIONS

Drainage	Parcel	Station	Analyte Groups				
X	D	PA50CB414	***Metals***		**SVOCs**	**Pest/PCB**	TPH
X	D	PA50CB416	***Metals***	VOCs	**SVOCs**	**Pest/PCB**	TPH
X	D	PA50CB415	***Metals***	VOCs	**SVOCs**	**Pest/PCB**	TPH

Notes:

- All samples were analyzed for metals, VOCs, SVOCs, Pest/PCB, and TPH.
- Tag (metals, for example) indicates a detection below NOAA's effects range-low (ERL) values occurred in the analyte group.
- Tag in **BOLD** (metals, for example) indicates a detection above NOAA's ERL values occurred in the analyte group.
- *ITALICIZED* Tag in **BOLD** (metals, for example) indicates a detection occurs in the analyte group above NOAA's values and above HPALs.
- There are no NOAA values for TPH

VOC = volatile organic compound
SVOC = semivolatile organic compound
Pest/PCB = pesticides and polychlorinated biphenyls
TPH = total petroleum hydrocarbon

TABLE 2

HUNTERS POINT ANNEX
SEDIMENT QUALITY DATA
MAXIMUM DETECTIONS

Category	Analyte	Value	Detection Limit	Units	Qualifier	Parcel	Drainage	Station
VOCs	1,1-DICHLOROETHANE	3000	21	µg/kg	A	D	VII	PA34SW07
VOCs	1,1,1-TRICHLOROETHANE	7400	21	µg/kg	A	D	VII	PA34SW07
VOCs	1,1,2-TRICHLOROETHANE	110	21	µg/kg	A	D	VII	PA34SW07
VOCs	1,2,4-TRICHLOROBENZENE	12000	18000	µg/kg	A	D	VIII	PA37SW05
VOCs	1,2-DICHLOROBENZENE	95000	18000	µg/kg	A	D	VIII	PA37SW05
VOCs	1,2-DICHLOROETHANE	140	21	µg/kg	A	D	VII	PA34SW07
VOCs	1,2-DICHLOROETHENE (TOTAL)	13000	21	µg/kg	A	D	VII	PA34SW07
VOCs	1,3-DICHLOROBENZENE	320000	18000	µg/kg	A	D	VIII	PA37SW05
VOCs	1,4-DICHLOROBENZENE	1400000	18000	µg/kg	A	D	VIII	PA37SW05
VOCs	2-BUTANONE	97.94	70	µg/kg	J7	C	V	PA50SW303
VOCs	2-HEXANONE	9	12	µg/kg	A	C	V	PA29SW09
VOCs	4-METHYL-2-PENTANONE	49.81	12	µg/kg	A	C	VI	PA50SW308
VOCs	ACETONE	360000	420000	µg/kg	J7	D	VIII	PA37SW05
VOCs	BENZENE	2200	180	µg/kg	A	D	VIII	PA37SW05
VOCs	CARBON DISULFIDE	129.7	15	µg/kg	J7	C	V	PA50CB305
VOCs	CHLOROBENZENE	5300000	420000	µg/kg	A	D	VIII	PA37SW05
VOCs	CHLOROETHANE	330	19	µg/kg	V	D	X	PA50CB416
VOCs	CHLOROFORM	180	21	µg/kg	A	D	VII	PA34SW07
VOCs	ETHYLBENZENE	130000	420000	µg/kg	A	D	VIII	PA37SW05
VOCs	METHYLENE CHLORIDE	34000	420000	µg/kg	A	D	VIII	PA37SW05
VOCs	TETRACHLOROETHENE	67000000	4400000	µg/kg	A	C	V	PA28SW66
VOCs	TOLUENE	68000	420000	µg/kg	A	D	VIII	PA37SW05
VOCs	TRICHLOROETHENE	17000	21	µg/kg	A	D	VII	PA34SW07
VOCs	VINYL CHLORIDE	66.72	12	µg/kg	A	D	VIII	PA50CB403
VOCs	XYLENE (TOTAL)	110000	420000	µg/kg	A	D	VIII	PA37SW05

TABLE 2 (Continued)

HUNTERS POINT ANNEX
SEDIMENT QUALITY DATA
MAXIMUM DETECTIONS

Category	Analyte	Value	Detection Limit	Units	Qualifier	Parcel	Drainage	Station
SVOCs	2-CHLOROPHENOL	35118.05	13000	µg/kg	J3	C	VI	PA29SW21
SVOCs	2,4-DIMETHYLPHENOL	2591.5	2300	µg/kg	J7	D	I	PA50CB410
SVOCs	2-METHYLNAPHTHALENE	27000	18000	µg/kg	A	D	VIII	PA37SW05
SVOCs	2-METHYLPHENOL	440	800	µg/kg	V	D	VII	PA34SW12
SVOCs	4,4'-DDD	1200	198	µg/kg	J3	D	VIII	PA50CB403
SVOCs	4,4'-DDE	610	34	µg/kg	A	D	VII	PA34SW07
SVOCs	4,4'-DDT	11	4.1	µg/kg	J3	C	V	PA29SW09
SVOCs	4-CHLORO-3-METHYLPHENOL	24132.92	13000	µg/kg	J3	C	VI	PA29SW21
SVOCs	4-METHYLPHENOL	2400	1400	µg/kg	A	D	VII	PA34SW07
SVOCs	ACENAPHTHENE	1800	2300	µg/kg	A	D	X	PA50CB414
SVOCs	ANTHRACENE	3212.49	2600	µg/kg	J05	E	I	PA50FC417
SVOCs	BENZO(A)ANTHRACENE	11751.46	28694	µg/kg	J3	B	II	PA50FC211
SVOCs	BENZO(A)PYRENE	28000	2300	µg/kg	A	D	X	PA50CB414
SVOCs	BENZO(B)FLUORANTHENE	6300	2300	µg/kg	A	D	X	PA50CB414
SVOCs	BENZO(G,H,I)PERYLENE	1100	2800	µg/kg	A	D	IX	PA50CB400
SVOCs	BENZO(K)FLUORANTHENE	3636.38	2600	µg/kg	J05	E	I	PA50FC417
SVOCs	BENZOIC ACID	190	6	µg/kg	V	D	VII	PA34SW12
SVOCs	BIS(2-ETHYLHEXYL)PHTHALATE	240000	18000	µg/kg	J7	D	VIII	PA37SW05
SVOCs	BUTYLBENZYLPHTHALATE	330000	18000	µg/kg	A	D	VIII	PA37SW05
SVOCs	CARBAZOLE	2300	2300	µg/kg	A	D	X	PA50CB414
SVOCs	CHRYSENE	20813.09	28694	µg/kg	J37	B	II	PA50FC211
SVOCs	DI-N-BUTYLPHTHALATE	48000	18000	µg/kg	A	D	VIII	PA37SW05
SVOCs	DIBENZOFURAN	1200	2300	µg/kg	A	D	X	PA50CB414

TABLE 2 (Continued)

HUNTERS POINT ANNEX
SEDIMENT QUALITY DATA
MAXIMUM DETECTIONS

Category	Analyte	Value	Detection Limit	Units	Qualifier	Parcel	Drainage	Station
SVOCs	DIMETHYLPHTHALATE	2400	2300	µg/kg	A	D	X	PA50CB414
SVOCs	FLUORANTHENE	18000	1400	µg/kg	A	D	VII	PA34SW07
SVOCs	FLUORENE	21000	200000	µg/kg	A	D	VIII	PA50CB402
SVOCs	INDENO(1,2,3-CD)PYRENE	2165.29	2600	µg/kg	J057	E	I	PA50FC417
SVOCs	NAPHTHALENE	28000	18000	µg/kg	A	D	VIII	PA37SW05
SVOCs	PENTACHLOROPHENOL	5000	3300	µg/kg	A	D	VII	PA34SW07
SVOCs	PHENANTHRENE	48000	200000	µg/kg	A	D	VIII	PA50CB402
SVOCs	PHENOL	28700.6	13000	µg/kg	J3	C	VI	PA29SW21
SVOCs	PYRENE	24000	18000	µg/kg	A	D	VIII	PA37SW05
Pest / PCBs	ALPHA-CHLORDANE	21	5	µg/kg	V	E	I	PA50SW501
Pest / PCBs	AROCLOR-1242	300	460	µg/kg	J3	B	IV	PA26SW04
Pest / PCBs	AROCLOR-1260	3900000	58000	µg/kg	A	D	VIII	PA37SW05
Pest / PCBs	DELTA-BHC	4.4	2.1	µg/kg	V	D	VII	PA34SW12
Pest / PCBs	DIELDRIN	20000	5800	µg/kg	A	D	VIII	PA37SW05
Pest / PCBs	ENDOSULFAN II	140000	5800	µg/kg	A	D	VIII	PA37SW05
Pest / PCBs	ENDRIN	27	8	µg/kg	A	D	VII	PA34SW10
Pest / PCBs	ENDRIN ALDEHYDE	81000	5800	µg/kg	A	D	VIII	PA37SW05
Pest / PCBs	ENDRIN KETONE	4800	5800	µg/kg	A	D	VIII	PA37SW05
Pest / PCBs	GAMMA-CHLORDANE	2500	3000	µg/kg	A	D	VIII	PA37SW05

TABLE 2 (Continued)

HUNTERS POINT ANNEX
SEDIMENT QUALITY DATA
MAXIMUM DETECTIONS

Category	Analyte	Value	Detection Limit	Units	Qualifier	Parcel	Drainage	Station
TPH	TOTAL OIL & GREASE	81000	69	mg/kg	A	B	IV	PA26SW04
TPH	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	44000	2500	mg/kg	A	C	V	PA50CB302
TPH	TPH-DIESEL	440000	3000	μg/kg	A	D	VII	PA34SW10
TPH	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	15000000	52000	μg/kg	A	D	VII	PA34SW07
TPH	TPH-GASOLINE	110000	35000	μg/kg	A	D	VIII	PA37SW05
TPH	TPH-PURGEABLE UNKNOWN HYDROCARBON	320000	180	μg/kg	A	D	VIII	PA37SW05
Metals	ALUMINUM	54900	16.8	mg/kg	A	C	V	PA29SW18
Metals	ANTIMONY	258.36	3.3	mg/kg	A	B	II	PA50CB200
Metals	ARSENIC	515	0.22	mg/kg	A	C	V	PA28SW66
Metals	BARIUM	4470	0.22	mg/kg	A	C	V	PA28SW66
Metals	BERYLLIUM	0.86	0.17	mg/kg	A	D	I	PA50CB410
Metals	CADMIUM	61.52	0.55	mg/kg	A	C	V	PA28SW01
Metals	CHROMIUM	4470	0.7	mg/kg	J3	C	V	PA28SW66
Metals	COBALT	74.6	2	mg/kg	A	C	VI	PA28SW22
Metals	COPPER	24100	0.96	mg/kg	A	C	V	PA28SW66
Metals	IRON	238513	7.71	mg/kg	V	D	I	PA50FC418
Metals	LEAD	14600	11.3	mg/kg	A	C	V	PA28SW66
Metals	MAGNESIUM	143000	16.5	mg/kg	A	C	VI	PA28SW22
Metals	MANGANESE	7388.94	0.36	mg/kg	V	D	I	PA50FC418
Metals	MERCURY	864	263	mg/kg	A	D	VII	PA34SW07
Metals	MOLYBDENUM	601.17	0.66	mg/kg	V	D	IX	PA57SW07

TABLE 2 (Continued)

HUNTERS POINT ANNEX
SEDIMENT QUALITY DATA
MAXIMUM DETECTIONS

Category	Analyte	Value	Detection Limit	Units	Qualifier	Parcel	Drainage	Station
Metals	NICKEL	5446.81	1.81	mg/kg	J3	D	I	PA50CB408
Metals	POTASSIUM	3750.16	213.67	mg/kg	A	D	I	PA50CB408
Metals	SELENIUM	30.3	10.6	mg/kg	J3	D	VIII	PA37SW05
Metals	SILVER	190.25	0.51	mg/kg	J3	B	II	PA50CB200
Metals	SODIUM	21345	33.31	mg/kg	VJ4	E	I	PA50SW501
Metals	THALLIUM	0.69	0.56	mg/kg	A	C	VI	PA28SW22
Metals	VANADIUM	573	1	mg/kg	A	D	IX	PA50CB400
Metals	ZINC	46706.4	0.41	mg/kg	J3	D	VI	PA57SW02

Notes:

A: Based on cursory validation, analytical results for this compound are acceptable without qualification.
J0: Analytical results are qualified as estimated due to noncompliance with internal standard area count or retention time criteria.
J3: Analytical results are qualified as estimated due to noncompliance with spike recovery criteria.
J4: Analytical results are qualified as estimated due to noncompliance with ICP serial dilution RPD criteria.
J5: Analytical results are qualified as estimated due to noncompliance with holding time criteria.
J7: Analytical results are qualified as estimated due to noncompliance with initial and continuing calibration criteria.
V: Analytical results received a full contract laboratory program (CLP) validation.
μg/kg: Microgram per kilogram
mg/kg: Milligram per kilogram

The only potential human exposure to contaminated sediments would be when the catch basins are cleaned or sediments are removed. This EE/CA evaluates sediment removal options that will minimize unsafe exposure. When no cleaning or removal take place, there is no completed human exposure pathway. Contaminated sediments could be entrained in groundwater discharges to the bay. However, exposure resulting from ingestion of bay water is considered incomplete since bay water is not used as a domestic drinking water source.

A potential indirect exposure pathway involves ingestion of fish and other aquatic life from the bay due to bioaccumulated contaminants.

3.2 POTENTIAL ENVIRONMENTAL IMPACTS

This section discusses potential environmental impacts from contaminated sediments.

Environmental impacts could occur from discharge of sediments to San Francisco Bay via the storm drain system. Aquatic life in the bay could be exposed to toxic constituents from ingestion of sedimentary material and from desorption of contaminants from sediments into bay water.

3.3 CHEMICALS OF CONCERN AND AREAS OF CONCERN

Identifying COCs and target areas for a removal action is a subjective decision process that involves professional judgment. Guidance for removal actions (EPA 1993) indicates that magnitude of threat is an important factor for determining the need for a removal action. The intent of removal actions at HPS is to focus on areas that present a high magnitude of threat to current receptors or areas where an action would likely be recommended following a remedial investigation and feasibility study (RI/FS) evaluation. COCs and areas of concern for this EE/CA were identified based on comparison of existing contaminant concentration data to screening criteria to assess the need for removal actions. A thorough evaluation of site-specific conditions that affect both current and future receptors and quantification of potential threats will be conducted as part of the ongoing RI/FS process at HPS.

ER-L screening criteria developed by NOAA were used to assess sediment COCs for the EE/CA. The ER-L value (NOAA 1994) for a constituent is the concentration equivalent to that calculated at the lower 10th percentile of available, screened sediment toxicity data. Thus, it represents the low end of the range of concentrations at which detrimental effects to coastal resources and habitats were observed in studies. ER-L values, which are presented in Table 3, are not promulgated standards and do not represent official NOAA policy. ER-Ls were chosen as conservative screening criteria for this

TABLE 3

HUNTER'S POINT ANNEX
STORM DRAIN EE/CA
NOAA SCREENING GUIDELINES

Analyte	Effects Range - Low (ppb) ER-L	Effects Range - Median (ppb) ER-M	Category
2-Methylnaphthalene	70	670	SVOCs
4,4'-DDE	2.2	27	SVOCs
4,4'-DDT	1.58	46.1	SVOCs
Acenaphthene	16	500	SVOCs
Acenaphthylene	44	640	SVOCs
Anthracene	85.3	1100	SVOCs
Benzo(a)anthracene	261	1600	SVOCs
Benzo(a)pyrene	430	1600	SVOCs
Chrysene	384	2800	SVOCs
Dibenzo(a,h)anthracene	63.4	260	SVOCs
Fluoranthene	600	5100	SVOCs
Fluorene	19	540	SVOCs
Naphthalene	160	2100	SVOCs
PAHs, total	4022	44792	SVOCs
Phenanthrene	240	1500	SVOCs
Pyrene	665	2600	SVOCs
Aroclor-1242	22.7	180	Pest / PCBs
Aroclor-1248	22.7	180	Pest / PCBs
Aroclor-1254	22.7	180	Pest / PCBs
Aroclor-1260	22.7	180	Pest / PCBs
Polychlorinated biphenyls	22.7	180	Pest / PCBs
Arsenic	8200	70000	Metals
Cadmium	1200	9600	Metals
Chromiumm	81000	370000	Metals
Chromium +3	81000	370000	Metals

TABLE 3 (Continued)

HUNTER'S POINT ANNEX
STORM DRAIN EE/CA
NOAA SCREENING GUIDELINES

Analyte	Effects Range - Low (ppb) ER-L	Effects Range - Median (ppb) ER-M	Category
Chromium +6	81000	370000	Metals
Copper	34000	270000	Metals
Lead	46700	300000	Metals
Mercury	150	710	Metals
Nickel	20900	51600	Metals
Silver	1000	3700	Metals
Zinc	150000	410000	Metals

ER-L = The concentration equivalent to that calculated at the lower 10th percentile at the available screened sediment toxicity data. As such, it represents the low end of the range of concentrations at which effects more observed in the studies compiled by Long and Morgan (1990).

ER-M = The concentration equivalent to that calculated at the lower 50th percentile at the available screened sediment toxicity data. This is the value where adverse biological effects would be predicted.

ppb = parts per billion

removal action.

Appendix A contains analytical data for sediment samples collected throughout HPS. Due to numerous individual analytes detected as part of the analysis for metals, VOC, SVOC, and pesticide/PCB in sediments, COCs are grouped according to analysis type for purposes of this EE/CA. Therefore, the following comparison of contaminants to screening criteria refers only to the contaminant groups and not to individual analytes.

Contaminant concentrations in sediment samples collected throughout the HPS storm drain system exceed the conservative ER-L values. Metals concentrations exceeded ER-Ls in all samples collected from the 68 catchbasins and manholes outside of Parcel A. All metals concentrations also exceeded soil background levels or Hunters Point Ambient Levels (HPALs) (presented in Table 4). SVOCs were detected in 42 of the 68 samples, with 35 of the detections exceeding ER-Ls. Pesticides/PCBs were detected above ER-Ls in 61 of the 68 samples. VOCs were detected in 33 of the samples, although none of the concentrations exceeded ER-Ls.

4.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

This section discusses the scope and objectives of the storm drain removal action and summarizes potentially applicable or relevant and appropriate requirements (ARAR) and to-be-considered (TBC) requirements.

4.1 REMOVAL ACTION SCOPE

The scope of this removal action is to reduce discharge of contaminated sediment from the HPS storm drain system to San Francisco Bay. The removal action is intended to be a final action for sediments within the storm drain system. This EE/CA involves removing sediments from the storm drain lines that contain CERCLA hazardous substances consistently detected above screening levels.

The infiltration of contaminated groundwater will be evaluated in the RI/FS process after the contaminated sediments are removed from the system; contaminants in water samples taken from the storm drain lines could be a result of contaminated sediments. An RI/FS will be completed for each

TABLE 4

HUNTERS POINT AMBIENT
STORM DRAIN EE/CA
HUNTERS POINT AMBIENT LEVELS (HPALs)

Analyte	Background Level (ppb)	Category
Antimony	9050	Metals
Arsenic	11100	Metals
Barium	314360	Metals
Beryllium	710	Metals
Cadmium	3140	Metals
Copper	124310	Metals
Lead	8990	Metals
Mercury	2280	Metals
Molybdenum	2680	Metals
Selenium	1950	Metals
Silver	1430	Metals
Thallium	810	Metals
Vanadium	117170	Metals
Zinc	109860	Metals

ppb = parts per billion

of the parcels, evaluating long-term remediation goals and alternatives for reducing contaminant concentrations within groundwater to these goals. Infiltration study sampling will be performed after all sediment removal is completed. Sampling data from the infiltration study will be used in the parcel FSs or will be the basis for a conditional ROD in parcels where an FS has already been completed.

4.2 REMOVAL ACTION OBJECTIVE

The overall goal of the storm drain system removal action is to reduce risk to the environment from sediment and contaminated groundwater infiltrating into and being discharged from the storm drain system. The specific objective is to:

> Mitigate risk posed by contaminated sediments that may release directly to the bay or may serve as a source for contaminants that could desorb when in contact with water flowing through the system.

The removal action will be compatible with future remedial actions planned at HPS.

4.3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The NCP states that "removal actions. . . shall to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws" (40 CFR Section 300.415[i]). This section overviews potential ARARs and discusses the identification of ARARs and TBC guidance for the storm drain removal action. Final ARARs will be presented in the action memorandum issued by the Navy for this removal action. The ARARs identified are for on-site actions. Off-site actions (such as disposal of sediments and discharges to the sanitary sewer) will comply with applicable requirements.

The purpose of this ARAR evaluation is to identify evaluate and set for the Navy's determination regarding potential federal and state ARARs for each removal alternative addressed in the EE/CA for the storm drain removal action.

4.3.1 Overview of Potential ARARs

The identification of ARARs is site-specific and involves the following two-part analysis: (1) determining whether a given requirement is applicable, and (2) if it is not applicable, determining whether it is relevant and appropriate. A requirement is deemed applicable if the specific terms of the law or regulation directly address the chemical of concern, the action, or the location of areas affected by hazardous substances. If a law or regulation is not applicable, it may be relevant and appropriate if the circumstances are sufficiently similar to circumstances in which the law otherwise applies and if the law or regulation is well-suited to the site conditions.

In addition to ARARs, the NCP preamble suggests that when ARARs do not exist, agency advisories, criteria, or guidance may be considered useful "in helping to determine what is protective at a site or how to carry out certain actions or requirements" (Federal Register 1994). The NCP preamble, however, states that use of provisions in the to be considered (TBC) category is discretionary and should be used, as appropriate, to establish cleanup goals or provide specific technical performance information (Federal Register 1994).

4.3.2 Identification of ARARs

ARARs are generally divided into three categories: chemical-specific, location-specific, and action-specific. The following sections discuss federal and state ARARs that are potentially applicable to the storm drain removal action.

4.3.2.1 Chemical-Specific ARARs

The storm drain action involves removing contaminated sediments from the system if they pose an imminent threat to potential surface water receptors. The scope of the removal action does not include restoring surface water or groundwater to background conditions. Therefore, it is not practicable to comply with chemical-specific ARARs for groundwater or surface water during this action. During the RI/FS, chemical-specific ARARs and site-specific cleanup levels will be developed to direct remedial actions for groundwater and surface water as appropriate. It is appropriate to evaluate chemical-specific ARARs for the sediment removal action because it is intended as the final action for sediments. Chemical-specific ARARs are generally health or risk-based numerical values or methodologies applied to site-specific conditions that result in the establishment of numerical values. No cleanup goals for sediment have been promulgated by EPA or the State of California. Consequently, by definition, no chemical-specific ARARs exist for sediment.

4.3.2.2 Location-Specific ARARs

Location-specific ARARs are restrictions on the concentrations of hazardous substances or on the conduct of activities solely because they are in specific locations. Special locations include flood plains, wetlands, historic places, and sensitive ecosystems or habitats. The storm drains exist throughout the HPS complex. HPS includes wetlands, sensitive habitats, and historic sites. However, the storm drain system is not routed in the vicinity of these special locations. Therefore, no location-specific ARARs are identified for this removal action based on current site data.

4.3.2.3 Action-Specific ARARs

Action-specific ARARs are technology- or activity-based requirements or limitations on actions taken with respect to hazardous substances. These requirements are triggered by the particular remedial activities selected. Action-specific ARARs alone do not determine the remedial alternative; rather, they indicate how a selected alternative must be implemented. Therefore, because action-specific ARARs depend on the action selected, they will be discussed after alternatives have been developed (see Sections 5.0 and 8.0). Table 5 lists examples of potential action-specific ARARs that were used as a basis for screening action-specific ARARs in Section 5.0 and 6.0.

The substantive requirements of the Resource Conservation and Recovery Act (RCRA) are potential ARARs for the removal actions. EPA has authorized the state of California to implement the hazardous waste program; therefore, RCRA citations reference the California Code of Regulations (CCR). The applicability or relevance and appropriateness of RCRA are related to whether hazardous wastes or material that contains a hazardous waste are being managed. A hazardous waste is a waste (any material that is discarded, relinquished, recycled, or inherently waste like [22 CCR 66261.2]) that exhibits one of the characteristics specified in 22 CCR Chapter 11, Article 3 or is listed in 22 CCR, Chapter 11, Article 4.

Soil, groundwater, sediment, and other environmental media are not considered wastes in and of themselves, but they may contain listed hazardous wastes or exhibit a characteristic of hazardous waste (EPA 1988, 1992; Wehling 1994). If managed on-site, environmental media containing a listed

TABLE 5

HUNTERS POINT ANNEX
STORM DRAIN EE/CA
POTENTIAL ACTION-SPECIFIC ARARs

Potential Action	Purpose/Requirement	Applicability to Removal Action	Citation
Waste Management	(1) Resource Conservation and Recovery Act (RCRA) outlines the requirements for the transportation, storage, treatment, and disposal of defined hazardous wastes. The regulations include standards to accommodate treatment and disposal of hazardous wastes in corrective action management units and treatment and storage in temporary units. The state of California has an authorized RCRA program.	Some of the materials which may be handled during any removal action (RA) at the storm drains may be, or contain, hazardous wastes. The specific requirements that may be ARARs will depend on the wastes handled and the technologies used.	22 CCR, Division 4.5
	(2) Regulations which establish waste management requirements, including groundwater monitoring, for waste treatment, storage, or disposal (TSD) in landfills, surface impoundments, waste piles, and land treatment facilities.	These regulations are applicable to any action that includes management of wastes in a landfill, surface impoundment, waste pile, and land treatment facility.	Title 23 CCR Division 3, Chapter 15
	(3) Regulations which govern the toxic substance program which is administered by EPA. The act also regulates the labeling and disposal of polychlorinated biphenyls (PCBs)	Regulates how PCBs may be disposed depending on PCB concentration.	Title 40 CFR 761
Air Emissions	Rules and regulations pertain to stationary sources of air emissions. Rules address visible emissions prohibition, incinerator standard, nuisance, and compliance with ambient air emission standards and other standards.	Substantive requirements are applicable to alternatives that have the potential to emit air pollutants.	San Francisco Bay Area Air Quality Management District Rules and Regulations, Rule 8, Regulation 40

waste or exhibiting a characteristic of hazardous waste must be managed according to applicable hazardous waste regulations until the listed waste or characteristic is removed from the environmental media. For off-site management, environmental media containing a listed waste or exhibiting a characteristic of hazardous waste must be managed consistently with other types of hazardous waste.

Hazardous waste identification regulations were reviewed by the Navy to determine if listed wastes may be present in the storm drain sediments. Because there is no documentation to support placement or discharge of listed hazardous wastes into the storm drain system, the sediments were determined not to contain listed wastes. However, based on a preliminary review of data available for storm drain sediments, some sediments may exhibit one or more of the toxicity characteristics of hazardous waste. The Navy has decided to store all the storm drain sediments on site in compliance with hazardous waste regulations, whether or not the sediment is determined to exhibit a hazardous waste characteristic.

Some removed sediments or concentrated wash water may exceed toxicity characteristic hazardous waste levels; therefore, they may contain a hazardous characteristic waste. The California regulations contain soluble threshold limits concentrations (STLC) and total threshold limit concentrations (TTLC) that define a characteristic waste (22 CCR 66261.24); if the concentrations of a material exceed either of these limits, the waste is considered characteristic. "Soluble concentrations" were not analyzed for the storm drain sediments. However, total concentrations of both organic and inorganic compounds were analyzed. The test method required in the regulations to determine STLCs is an extraction method that involves a 10-fold dilution of the solid sample. If all of a constituent leaches out of a solid sample during extraction, it will be diluted by a factor of 10 as part of the procedure. Therefore, for purposes of technology evaluations that follow, total sediment concentrations were compared to 10 times the STLC to estimate whether the sediments will contain a hazardous waste. This is a conservative approach since the TTLCs are at least 10 times greater than the STLCs. A total of 68 sediments samples were analyzed. There will be some mixing of sediments during any removal action; therefore, maximum concentration levels are not consider to be the ultimate concentration of the material. It is estimated that if more than 10 percent of the sample results (7 sample results) exceeded 10 times the STLC, the constituent is identified as a potential hazardous waste constituent. The comparison indicated that the sediments may exceed toxicity characteristic levels for copper, chromium, lead, nickel, and zinc. (During the removal action, any removed sediments will be analyzed using both extraction and total analyses to characterize the material.)

The RCRA requirements are relevant and appropriate for management of the sediments and contaminated water that exceed toxicity characteristic levels. The manner in which these materials are handled depends on the nature of the materials and the specific removal actions performed. Materials will first be characterized, as hazardous waste (including those materials containing hazardous wastes), solid wastes, or nonsolid wastes. For example, if removed contaminated sediments exhibit RCRA characteristic levels, as defined in 22 CCR Division 4.5, Chapter 11, Article 3, the sediments would be handled as RCRA hazardous wastes until the characteristic levels are no longer exhibited, in accordance with EPA's contained-in policy. Therefore, all on-site storage, disposal, or treatment units that handle the sediments classified as hazardous wastes would comply with federal and state RCRA Subtitle C regulations.

The first regulation under Title 22 of CCR that is considered essential for remedial activities is the CAMU and temporary unit (TU) rule (22 CCR Section 66264.552). The CAMU and TU provisions were developed because the intent of CERCLA risk and technology evaluations was often undermined by RCRA requirements. This rule allows alternative, performance-based requirements for managing remediation wastes (including groundwater, soils, and debris) within a CAMU or TU. A CAMU is an area of contiguous contamination that is established on a site-by-site basis to facilitate remedial activities (including long-term, on-site management of environmental media in a land-based unit). A temporary unit is a management unit that is intended to manage contaminated media only over the short term. The CAMU and TU provisions are ARARs for alternatives that include an on-site, land-based, long-term management unit and any on-site treatment units.

Invoking the CAMU rule at a site puts in effect long-term liabilities and closure and post-closure responsibilities. The CAMU provisions are ideal for HPS because the facility has a land-based disposal unit (Site IR-1/21) that is currently undergoing an RI/FS. Wastes will be left in place within the unit; therefore, liabilities and closure and post-closure care will be associated with this unit whether or not additional contaminated media are consolidated within the unit. Consolidating contaminated material (sediments) within the existing HPS landfill maximizes use of the landfill and does not use up limited landfill capacity. The state could perceive the consolidation as reopening the landfill and require more stringent closure features than if the landfill was not used for consolidation. However, the Navy believes that since consolidation is not placement, it would undermine the intent of CAMU for the state to view the consolidation as rationale for invoking more stringent closure requirements.

The CAMU approval process requires (1) the Navy to submit a proposal to DTSC for establishment of the unit, (2) DTSC to evaluate the proposal against criteria established in the regulations, and (3) the DTSC regional administrator to approve the CAMU. The Navy has not formally proposed establishment of a CAMU at HPS to date. However, the Navy may consider this option for future remedial activities at HPS.

The land disposal restriction (LDR) regulations prohibit the disposal of hazardous wastes unless treatment standards are met, but only if the wastes are placed in a land-based unit after the effective date of the regulations. The LDR regulations would not be ARARs for the on-site disposal option because consolidation of contaminated material within a CAMU is not considered placement (EPA 1988).

In addition, the California SWRCB has promulgated regulations directed at maintaining water quality, in accordance with the authority established under the Porter-Cologne Water Quality Control Act. The sections that provide requirements for land-based waste management units that handle hazardous waste (23 CCR 2531) are ARARs for removal actions that involve on-site disposal of hazardous wastes or contaminated environmental media that exhibit the toxicity characteristic concentrations.

RCRA Subtitle D as codified in 40 Code of Federal Regulations (CFR) 257 and 258 establishes requirements governing the management and disposal of nonhazardous solid wastes. In addition, the California Integrated Waste Management Board (IWMB) has promulgated regulations for the handling and disposal of solid wastes, and SWRCB regulations (23 CCR Division 2, Chapter 15) address the disposal of nonhazardous and designated solid wastes. Nonhazardous sediments that are disposed of at off-site landfills will be managed according to these regulations. Nonhazardous sediments that are managed on-site may be used as backfill material or as capping or subgrade material at the IR 1/21 landfill. These sediments are not considered wastes for the purposes of applying ARARs. However, Chapter 15 SWRCB regulations may be relevant and appropriate for placement of these sediments on land. .

Even though available data shows only one sample above 50 parts per million (ppm), the Toxic Substances Control Act (TSCA) will be listed as an ARAR if samples with PCB concentrations over 50 ppm are generated. Below 5 ppm, the sediment is considered nonhazardous and will be accepted at most Class II landfills. Between 5 and 50 ppm, the sediment is considered non-RCRA hazardous and must be disposed of in a Class I landfill. If the concentration exceeds 50 ppm, the sediment must be disposed of in a TSCA-permitted landfill.

The storm drain removal action may include an on-site discharge, such as air emissions. The Bay Air Quality Management District (BAAQMD) requirements for managing stockpiled soil (Rule 8, Regulation 40) are relevant and appropriate to any action that removes and stockpiles sediments from the storm drain.

Off-site activities, such as discharge to the publicly owned treatment works (POTW) and landfilling, must comply with all applicable requirements, such as POTW acceptance criteria and LDRs.

5.0 SEDIMENT REMOVAL ACTION OPTIONS

Cleaning of sediments from manholes, catchbasins, and storm drain lines in Parcels B, C, D, and E is considered critical to removing the potential threat posed by contaminated sediments within the storm drain system at HPS. This section therefore addresses implementation of sediment removal in conjunction with several available sediment management options for the sediment portion of the storm drain system removal action.

Section 5.1 briefly describes anticipated sediment removal procedures, Section 5.2 conducts a preliminary screening of available sediment management options, and Section 5.3 analyzes sediment removal combined with the sediment management options. Sediments to be removed from the storm drain system fall into two categories: sediments that contain a hazardous waste and sediments that do not. The technology discussions address each group separately.

5.1 SEDIMENT REMOVAL PROCEDURES

Cleaning of manholes will be accomplished primarily through the use of a vacuum truck. Manhole sediments will be loosened by rodding and vacuumed into the hopper of the vacuum truck or rolloff. Stubborn sediments will be loosened by hand shovel.

The lines will be cleaned with a high-pressure jet washer suitable for cleaning gravity flow storm drain lines. The outlet of the downstream manhole will be plugged in order to contain washwater and sediments. The resulting sediment slurry will be collected in specially adapted rolloffs equipped with filters and decanting equipment. Water in the slurry will be removed by causing a slight vacuum on the downstream side of the filters. This water will be decanted into a nearby baker tank until remaining solids pass the paint filter liquids test.

Decanted water will be reused whenever possible for additional line cleaning. Spent wash water will be characterized before discharge to the local POTW. This water is expected to meet POTW acceptance criteria based on pretreatment standards, sediment concentrations, and vendor information.

All sediments will be characterized as hazardous or nonhazardous. Results of the characterization will dictate subsequent management practices for sediments in each container. Characterization will be accelerated to the extent possible to facilitate completion of cleaning.

5.2 SEDIMENT MANAGEMENT TECHNOLOGY SCREENING

A number of potential options exist that are technically implementable for management of removed sediments. These include off-site disposal, on-site management, and on-site treatment. The following subsections describe each of these options in relation to sediment removal actions.

5.2.1 Off-Site Disposal

Off-site disposal would entail transportation of sediments to a commercial disposal facility. Stockpiled sediments would be sampled for analysis to determine waste characteristics. Sediments that exceed hazardous characteristic levels would be transported in lined containers to a Class I landfill, treated at the landfill to meet LDRs, and disposed of. Sediments that do not exceed hazardous levels would be transported to a Class III landfill.

All sediments that contain a hazardous waste must be treated to meet LDRs before they can be disposed of. As stated previously, the constituents which may require that sediments be handled as a hazardous waste include copper, chromium, lead, nickel, and zinc. Copper is the only metal with a treatment standard that exceeds the toxicity characteristic level (230 milligrams per liter [mg/L] versus 25 mg/L in the waste extract). Treatment standards for all the other metals are identical to the characteristic level. Therefore, if copper were treated to its treatment standard, the treated sediment could be disposed of, but only in an off-site Class I landfill because the sediment would still contain a hazardous waste. Conversely, if copper waste were not present in the sediment and other metals were treated to corresponding treatment standards, the sediment would no longer contain a hazardous waste and would not need to be disposed of in a Class I landfill.

All sediments that contain organic constituents above the universal treatment standards found at 40 CFR 268.48 or 22 CCR 6628.40 may be banned from land disposal unless the sediments are treated. Comparing sediment data with the universal treatment standards in 40 CFR 268.48 indicates that 20 percent of the sediment may need to be handled in this way. Actual sediment quality may vary widely from these projections.

This option is effective in both the short and long term at reducing environmental concerns associated with contaminated sediments at HPS. Although implementable, analytical documentation and manifesting requirements to transport and dispose of hazardous sediments could be extensive. Because of effectiveness and implementability, this option is retained for further consideration in the EE/CA.

5.2.2 On-Site Management

On-site management involves disposal of sediments in an on-site cell if levels of contaminants exceed characteristic toxicity limits. The on-site feasibility of this option for sediments containing hazardous wastes mandates the establishment of a CAMU and use of a performance-based cell design.

Sediments that do not contain a hazardous waste (that is, do not exceed hazardous characteristic toxicity levels) would be stockpiled and used as a subbase for the anticipated future cap of the landfill (Site IR-1/21). The Navy does not consider removed sediments from the storm drain to be waste-like and compares the use of sediments for landfill construction to use of soil from a borrow pit. Only the decision to dispose of the sediments would make them waste-like and invoke solid waste management requirements.

The protectiveness of using contaminated sediments on-site to human and environmental receptors is related to the exposure pathway associated with the area where sediments are ultimately used. Sediment contaminant concentrations may exceed published health based levels such as EPAs industrial preliminary remediation goals (PRGs) (EPA 1994). However, PRGs assume completed exposure pathways for dermal contact, ingestion, and inhalation. If the sediments are used as subbase for a landfill cap, these exposure pathways will not be complete.

This option would be effective at mitigating potential exposure to human and environmental receptors. On-site management is implementable, but establishment of a CAMU could pose potential difficulties administratively. However, the CAMU rule was promulgated to facilitate the consideration of this technology at CERCLA sites. This option is retained for further consideration in this EE/CA.

5.2.3 On-Site Treatment

Several technologies for treatment of organic and inorganic contamination could be used for storm drain sediments. The technologies include soil washing, thermal treatment, biological treatment, and stabilization.

Thermal and biological treatment apply only to treatment of organic compounds. Due to the metals content of HPS sediments, use of these technologies would require additional treatment to reduce metals leachability. Thermal and biological treatment were therefore not included for screening purposes.

5.2.3.1 Soil Washing

Soil washing is a physical treatment process that involves extraction of contaminants from soil matrices by solubilization in a liquid washing solution. Contaminant removal is also affected by separation of particles to which contaminants are adsorbed. As a result, a lower volume waste stream may result.

Contaminated soils are introduced to a soil washing unit and mechanically combined with a washing solution, which is usually composed of water and enhancing agents such as surfactants, pH adjusters, or chelating agents. Treated soil is dewatered and cleaned of any residual additive compounds. Spent washing solution is treated to remove contaminants and recycled back to the treatment unit. Because contaminants have a tendency to adhere to organic carbon and the fine-grained soil fraction (silt and clay) as opposed to the coarse-grained fraction (sands and gravels), much of the contamination may be removed with fine-grained material entrained in the washing solution effluent. Residual fine-grained material removed from the washing solution is a smaller and generally more concentrated waste stream than the original soil material. Additional treatment or disposal is then required for this waste stream, as well as for any waste washing solution.

Because the additives are selective, soil washing is more appropriate for wastes containing either metals or organics. Although effective on sands and gravel, this technology is limited with respect to finer-grained soils due to less effective contaminant solubilization and diminished waste stream volume reduction.

Due to the complex nature of contaminants in the HPS sediments (combined organics and metals contamination), as well as the fact that sediments removed from the storm drain system will be fine-grained, the potential effectiveness of soil washing is expected to be low. Furthermore, treatment of waste washing solution and residual fines would add considerable complexity and cost to the removal action. Soil washing was therefore eliminated from consideration for purposes of this EE/CA.

5.2.3.2 Stabilization

Stabilization involves reduction of contaminant mobility through binding of hazardous constituents into a solid matrix with low permeability. Waste materials are combined with stabilizing agents either in situ or in tanks or containers. Several types of stabilizing agents can be used in the stabilization process; these include cement-based, silicate-based (pozzolonic), thermoplastic-based, or organic polymer-based. The mechanism of binding depends on the type of stabilizing agent used.

To date, stabilization has been most effective at treating inorganic contaminants. Stabilizing agents have been developed, however, for use in treating oily sludges and soils contaminated with solvents. The presence of fine particle size waste materials can delay setting and curing, and can also weaken bonds between particles and stabilizing reagents. Treatability studies are generally required for selection of stabilizing agents and other additives, and for determining waste-to-additive ratios and curing time requirements. Leaching tests and compressive strength tests are also required to determine the integrity of the stabilized product. The long-term effectiveness of stabilization is not well known.

Stabilization could be implemented in conjunction with on-site or off-site landfilling of hazardous sediments. This technology may be effective for decreasing leaching potential of metals and solvent constituents in HPS sediments and thus reducing environmental concerns associated with on-site disposal. The technology is commercially available and is implementable. Stabilization is therefore retained for further consideration in this EE/CA.

5.3 ANALYSIS OF SEDIMENT REMOVAL ACTION OPTIONS

Each sediment management option that was retained for consideration as part of this EE/CA is described in the following sections and evaluated in conjunction with sediment removal according to effectiveness, implementability, and cost. The effectiveness evaluation considered overall protection of the environment, compliance with ARARs and other guidance, and the long- and short-term effectiveness of each option. The implementability evaluation considered each option in terms of technical feasibility, administrative feasibility, and public acceptance. The cost analysis included a variety of factors and considered the relative economic feasibilities of option components.

5.3.1 Off-Site Disposal

This option consists of cleaning the manholes and lines and disposing of sediments in an appropriate off-site landfill.

After sediments have been characterized, hazardous sediments will be transported to a Class I landfill for disposal. LDRs for metals may require stabilization of the hazardous sediments to reduce metals leachability; stabilization would be conducted by the disposal facility and would be reflected in the unit cost for disposal. Any sediments with organic containment concentrations exceeding LDRs would be transported and disposed of at a Class I landfill with the appropriate treatment facilities.

The off-site disposal option for sediments not exceeding hazardous levels would entail transporting and disposing of the sediments in a Class II or III landfill.

5.3.1.1 Effectiveness

Sediment removal and off-site disposal is effective in meeting most of the removal action objectives. Contamination associated with the hazardous sediments would be removed, thus alleviating any further potential exposure to human health and the environment. Off-site disposal would also reduce the overall exposure time of the removal and thereby reduce risk potentially affecting human health or the environment. Disposal of nonhazardous substances off site would similarly remove potential exposure pathways.

Short-term exposure to workers and the environment is minimized by storing removed sediment under impermeable coverings during characterization sampling and by use of proper personal protective equipment (PPE). Most likely, Level D would be adequate for workers during construction activities. This alternative would take a relatively short period of time to implement and approximately 35 weeks to complete.

This alternative can be implemented to comply with all ARARs presented in Table 5. Sediments typically do not fall under any waste management regulations. However, if the sediments are destined for disposal (as in this alternative) they become waste-like and waste management requirements may be ARARs. Sediments containing constituents at levels that exceed toxicity characteristic criteria will be stored on-site in compliance with hazardous waste regulations. Specifically, once the analytical information is obtained, the containers will be appropriately labeled and prepared for shipment. Sediments that do not exceed toxicity characteristic levels do not require similar handling.

The sediments are not expected to generate off-gas emissions that will require control technologies since most of the primary contaminants have low volatilities. However, rolloff bins and any stockpiles will be covered to reduce the possibility of emissions.

5.3.1.2 Implementability

The sediment removal portion of this alternative would be both technically and administratively feasible. The equipment and methods used for this type of removal are readily available and common to the industry. The off-site disposal portion of this alternative is also technically feasible. Several trucking companies in the area have experience in transporting hazardous wastes. Although stabilization to reduce metals leachability or treatment for organic contaminants may be required for some sediments, the implementability of this option would not be affected because stabilization or treatment would be conducted by the respective disposal facility. Administrative feasibility should also be achievable. Manifests would need to be prepared for transportation of sediments to the appropriate disposal facility.

5.3.1.3 Cost

The primary costs associated with this option result from off-site disposal fees and hauling requirements. Off-site disposal of hazardous sediments requiring stabilization in a Class I landfill costs approximately $230.00 per ton (including hauling), and disposal of sediments requiring treatment for organics costs approximately $600 per ton. Off-site disposal of nonhazardous sediments in a Class II or III landfill is relatively more expensive than on-site reuse. Approximate costs for Class II or III landfilling of nonhazardous sediments are $49.00 per ton, whereas approximate costs for on-site reuse are $17.00 per ton.

5.3.2 On-Site Management

This option involves disposal of sediments in an on-site cell if levels of contaminants exceed characteristic toxicity limits. The on-site cell would incorporate performance-based design requirements because it would be located within the HPS CAMU. The cell would be constructed in the HPS landfill area (Site IR-1/21). The cell would include a low permeability liner (6 inches of sand, a 20 millimeter [mil] thick high density polyethylene (HDPE) liner, and 1 foot of soil) and cap (6 inches of sand, a 20-mil thick HDPE liner, 1 foot of sand, and 2 feet of vegetative cover). Three groundwater monitoring wells, one upgradient and two downgradient, would be installed and a groundwater monitoring program implemented.

Sediments that do not exceed characteristic levels would be moved to the landfill area, stockpiled, and used as a subbase for the anticipated future cap of the Site IR-1/21 landfill.

5.3.2.1 Effectiveness

Sediment removal and on-site management is effective in meeting most remedial action objectives (RAOs). Contamination would be removed from the storm drain system, reducing immediate threats to surface water receptors. Removed sediments would be managed in a manner that would eliminate unsafe exposure pathways. Waste would remain on-site but would be contained in the landfill area. The landfill area would be evaluated further under a separate RI/FS process for additional remedial action that is considered protective. A removal action focusing on reducing contaminated groundwater migration is recommended at the landfill under a separate EE/CA (PRC 1996a).

Short-term exposure to workers and the environment is minimized by storing removed sediment under impermeable coverings during characterization sampling, and by use of proper PPE. Most likely, Level D PPE would be adequate for workers during construction activities.

This option would take a relatively short period of time to implement, although stockpiled soils may remain covered on site until needed for landfill construction. It would achieve long-term protectiveness by reducing mobility of the sediments within the storm drain system. This option does not propose treating soils, but does effectively mitigate contamination present in the sediment by removal and appropriate management.

This option maximizes the use of the on-site landfill (Site IR-1/21). Site IR-1/21 is a 36-acre, horseshoe-shaped area along the southwestern shoreline of HPS. This landfill will be a long-term feature at HPS. Using sediments as a subbase for the anticipated future cap will reduce the overall remediation cost for this unit. The ultimate landfill cap will provide additional protection against unsafe exposure pathways.

This option can be implemented to comply with all ARARs presented in Table 5. Sediments typically do not fall under any waste management regulations because they are not considered waste-like.

However, if the sediments are destined for disposal (as the sediments that exceed hazardous levels are), they become waste-like and waste management requirements may be ARARs. Sediments containing constituents at levels that exceed toxicity characteristic levels will be managed on-site as a RCRA hazardous wastes.

The hazardous waste regulations include CAMU provisions. The entire HPS complex aside from Parcel A meets the definition of a CAMU. Therefore, consolidation of sediments in a disposal cell within the CAMU will not be considered placement, and full containment standards are not required. The proposed cell will provide adequate protection for the sediments exceeding toxicity levels.

Invoking CAMU at a site puts in effect long-term liabilities and closure and post-closure responsibilities. The CAMU provisions are ideal for HPS because the facility has a land-based disposal unit (Site IR-1/21) that is currently undergoing an RI/FS. Wastes will be left in place within the unit; therefore, liabilities and closure and post-closure care will be associated with this unit regardless of whether additional contaminated media are consolidated within the unit. Consolidating contaminated material within the existing landfill maximizes use of the landfill and does not use up limited landfill capacity. The state could perceive the consolidation as reopening of the landfill and require more stringent closure features than if the landfill was not used for consolidation. Sediments containing contaminant concentrations that do not exceed toxicity characteristic levels are not destined for disposal, and therefore do not have management ARARs. These nonhazardous sediments would be placed under the landfill cap. Therefore, exposure pathways of dermal contact, ingestion, and inhalation are not complete.

The sediments are not expected to generate off-gas emissions that will require control technologies since the most of the primary contaminants have low volatilities. Roll-off containers and stockpiles will be covered, however, to reduce the possibility of emissions.

5.3.2.2 Implementability

The sediment removal portion of this option would be both technically and administratively feasible. The equipment and methods used for this type of removal are readily available and common to the industry. The on-site disposal portion of this alternative is also technically feasible. These methods of management are common and can be implemented by a variety of companies in the area. The administrative features of on-site disposal would also be achievable. Extensive regulatory agency coordination will be necessary to establish the CAMU for this alternative and to obtain approval for the disposal cell design and monitoring program.

5.3.2.3 Cost

The primary costs associated with disposal of hazardous sediments on-site result from requirements for construction of a lined cell with layered cap; hauling, placement, and compaction of the sediments; and groundwater monitoring.

Approximate unit cost for disposal of hazardous sediments in an on-site cell is $80.00 per ton. Annual monitoring costs, however, are considerable, and add approximately $120.00 per ton to this amount (based on the present value of a conservative 5-year quarterly monitoring program). Additional costs of approximately $17.00 per ton, roughly the same as for the previous option, will be incurred for on-site reuse of nonhazardous sediments.

5.3.3 On-Site Treatment

This option involves on-site stabilization of removed sediments with TCLP extracts exceeding LDRs to reduce metals leachability. Bulk mechanical mixing equipment would be mobilized to the site and used to combine the sediments with stabilizing reagents, which may include materials such as lime, fly ash, and proprietary additives. Stabilized sediments would then be placed in rolloff containers and allowed to cure. After an approximately 1-week curing time, additional sampling would be conducted to ensure that stabilized materials meet LDRs. Stabilizing these sediments will enable disposal at a Class II or III landfill thus reducing costs that would otherwise be incurred for disposal at a Class I landfill. Stabilized materials not passing the toxicity level requirements must be transported to a Class I landfill for additional treatment or disposal or consolidated in a CAMU.

Because stabilization processes typically have limited effectiveness in treating organic constituents, sediments with organic containment concentrations exceeding LDRs will not be stabilized on site. Rather, these sediments will be transported to a disposal facility equipped to treat the organic containments to beneath LDRs.

5.3.3.1 Effectiveness

Stabilization and off-site disposal at a Class III landfill will be effective for removing the threat posed by sediments with leachable metals. Combined with off-site disposal of organic contaminants in concentrations exceeding LDRs, this option is effective in meeting most of the removal action objectives. Contamination would be removed from the storm drain system, thus reducing threats to surface water and benthic receptors. The removed sediments would be managed in a manner that would eliminate unsafe exposure pathways while the sediments remain on-site. Once removed and disposed of off site, the sediments would no longer present a potential exposure pathway.

Short-term exposure to workers and the environment is minimized by storing removed sediment under impermeable coverings during characterization sampling and while stockpiled. Although emissions are not anticipated to be a problem, dust generation will be minimized by using water sprays as necessary to prevent drying of the sediments during management activities before stabilization. Use of proper PPE will also minimize personnel exposure. Level D PPE would likely be adequate for workers during treatment activities.

This option would achieve long-term protectiveness by reducing mobility of the sediments within the storm drain system and by removing exposure pathways associated with the sediments.

This option can be implemented to comply with all ARARs presented in Table 5. Sediments typically do not fall under any waste management regulation because they are not considered waste-like. However, if the sediments are destined for disposal (as the sediments that exceed hazardous levels are) they become waste-like and waste management requirements may be ARARs. Sediments containing constituents at levels that exceed toxicity characteristic levels would be managed on-site as a RCRA hazardous waste. Stabilized sediments that do not exceed toxicity characteristic levels do not require handling as hazardous waste.

5.3.3.2 Implementability

Stabilization would be technically and administratively feasible. Implementation would require mobilization of mechanical mixing equipment and conveyors, as well as transportation and storage of stabilizing reagents. Treatability studies will be required to determine the appropriate reagents and waste to reagent ratios.

Space will be required to retain rolloff containers during curing and while analytical results are pending. Sampling frequencies will be established by the disposal facility. Once analytical results confirm that stabilized sediments are acceptable for disposal in a Class II or III landfill, the sediments can be removed from the site. The off-site disposal portion of this option, for stabilized sediments and for sediments with organic contaminant concentrations exceeding LDRs, is also technically feasible. A variety of trucking companies are available for transporting the sediments to an appropriate disposal facility. Manifesting requirements will apply for transportation of the sediments.

5.3.3.3 Cost

On-site stabilization of hazardous sediments entails considerable on-site labor and equipment requirements for setup and operation of the stabilization plant. Off-site disposal costs are reduced, however, since stabilized sediments can be disposed in a Class II or III landfill instead of a Class I landfill.

Approximate unit cost for on-site stabilization is $60.00 per ton. Added costs of approximately $49 per ton are incurred for hauling and disposal to a Class II or III landfill.

6.0 IDENTIFICATION OF REMOVAL ACTION ALTERNATIVES

Alternatives have been developed for the storm drain removal action based on information presented in Sections 5.0. The off-site disposal, on-site management, and on-site treatment options were retained. The selected alternatives are:

Alternative 1:	Sediment removal, off-site disposal of hazardous sediments
Alternative 2:	Sediment removal, off-site disposal of all sediments
Alternative 3:	Sediment removal, on-site management of all sediments
Alternative 4:	Sediment removal, on-site treatment of hazardous sediments

7.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION OPTIONS

In this section, the removal action alternatives outlined in Section 6.0 are compared to evaluate the relative performance of each. The criteria used in this comparison are effectiveness, implementability, and cost, which were discussed in relation to each of the individual sediment options in Sections 5.2. Table 6 summarizes the comparative analysis and ranks the alternative.

The cost evaluations provided are based on estimates for capital and annual operation and maintenance (O&M) costs. Capital costs include the costs for material, labor, and equipment for construction, and mobilization, and decommissioning. O&M costs include equipment rental, labor, analytical costs, and transportation. For this analysis, costs were obtained from Means Site Work and Landscape Cost Data (Means 1995), Environmental Cost Handling Options and Solutions (ECHOS 1995), and vendor quotes. The cost estimates are comparative estimates with an accuracy of +50 to -30 percent. A present worth analysis provides a single figure representing the amount of money that, if invested in the base year and dispersed as needed, would cover all cost associated with the alternative. The present worth calculation normalizes alternatives that have differing operating lifetimes to facilitate comparisons.

7.1 EFFECTIVENESS OF ALTERNATIVES

All four alternatives proposed for this removal action are expected to meet RAOs similarly, provide protection of human health and the environment, and comply with identified ARARs. Alternatives 1 and 2, which involve off-site disposal of part or all of the sediments, and Alternative 4, which involves on-site treatment (with off-site disposal), would be slightly more effective in that sediments would be disposed of completely off site in an approved landfill, thereby removing any possibility that contaminants from hazardous sediments would enter the groundwater table at HPS through leaching. The leaching possibility still exists at the off-site facility; however, this potential is minimized through treatment (either on site or at the disposal facility). On-site disposal of hazardous sediments in a lined cell would, for the most part, mitigate on-site leaching, but it would not completely eliminate the possibility. The on-site landfill, however, will be a long-term feature of the base. This landfill will require long-term monitoring, most probably capping, and groundwater control. Using the on-site landfill would maximize use of the landfill and make ultimate remedies for the landfill more cost effective.

7.2 IMPLEMENTABILITY OF ALTERNATIVES

Alternatives 1 and 2 are more easily implementable than are Alternatives 3 and 4. Off-site disposal of hazardous sediments (Alternatives 1 and 2) does not require the construction effort associated with

TABLE 6

HUNTERS POINT ANNEX
STORM DRAIN EE/CA
COMPARISON OF REMOVAL ACTION OBJECTIVES

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Overall Protection of Human Health and the Environment	1	1	1	1
Compliance With ARARs	1	1	1	1
Long-term Effectiveness	1	1	2	1
Reduction of Toxicity, Mobility, and Volume	2	2	3	2
Short-term Effectiveness	1	1	2	2
Implementability	3	1	4	3
Cost	2	3	1	4
State and Community Acceptance	1	1	3	1
Sum	12	11	17	15
Overall Rating	1.5	1.4	2.1	1.9

Ranking Scale:

1 Meets Criteria Best
5 Meets Criteria Least

on-site management or the stabilization activities with on-site treatment. On-site management of hazardous sediment may be difficult to implement administratively due to regulatory requirements for disposal in a CAMU. Off-site disposal of hazardous sediments reduces liability related to on-site placement of sediments, and also does not involve the administrative effort required for establishment of a CAMU.

Alternative 2, which involves off-site disposal of nonhazardous sediments as well as hazardous sediments, is slightly more implementable than Alternative 1, which involves on-site management of nonhazardous sediments. Use of the nonhazardous sediments for construction of the Site IR-1/21 landfill is expected to entail administrative effort above that required for off-site disposal due to coordination with regulatory officials and potential treatment requirements.

7.3 COST OF ALTERNATIVES

Relative costs associated with the proposed alternatives are summarized in Table 7. Detailed cost opinions are provided in Appendix B. As can be seen from Table 7, Alternative 3 has a lower cost than the other alternatives. All costs may vary significantly if more material is considered hazardous than the quantities used in the opinions.

TABLE 7

HUNTERS POINT ANNEX
STORM DRAIN EE/CA
COMPARISON OF REMOVAL ACTION ALTERNATIVE COSTS

Alternative	Estimated Construction Costs[1]
1	$2,400,000
2	$2,470,000
3	$1,800,000
4	$2,500,000

Note:

1 Costs include present worth of anticipated O&M requirements.

8.0 RECOMMENDED REMOVAL ACTION ALTERNATIVE

This EE/CA was conducted in accordance with current EPA guidance documents for a non-time critical removal action under CERCLA (EPA 1988, 1993). The purpose of the EE/CA was to identify and analyze alternative removal actions to address potential discharge of sediments to San Francisco Bay from the HPS storm drain system. Four alternatives were identified, evaluated, and ranked according to effectiveness, implementability, and cost:

Alternative 1:	Sediment removal, off-site disposal of hazardous sediments
Alternative 2:	Sediment removal, off-site disposal of all sediments
Alternative 3:	Sediment removal, on-site management of all sediments
Alternative 4:	Sediment removal, on-site treatment of hazardous sediments

Based on analyses of the removal options completed in Sections 5.0 and comparative analyses of the selected removal action alternatives completed in Section 7.0, the recommended removal action is Alternative 2. Under this alternative, all storm drain sediments would be removed. Removed sediments will be characterized and sediments with metals concentrations that exceed LDR TCLP criteria will be disposed offsite in a Class I landfill. Sediments with organic constituent concentrations exceeding LDRs will be disposed of at an off-site facility equipped to treat the organic constituents to beneath LDR standards. Remaining sediments will be disposed of in a Class II or III land fill.

Because all the alternatives presented involved sediment removal, the primary variable with regard to selection of one of the alternatives is the method of sediment management and disposal. Off-site landfilling of both hazardous and nonhazardous sediments with off-site treatment of sediments exceeding LDRs is recommended because it is more easily implemented than the other alternatives. Alternative 3, which involves on-site management of all sediments, costs the least of the alternatives. Implementability issues associated with invocation of the CAMU rule for Alternative 3, however, overshadow its potential cost effectiveness. Although off-site disposal of hazardous sediments combined with on-site management of nonhazardous sediments is slightly more cost-effective than off-site disposal of all sediments, it is considered less implementable due to administrative issues associated with on-site reuse of nonhazardous sediments. Finally, off-site disposal of sediments is more cost effective than on-site treatment, and is also considered more implementable.

Alternative 2 is considered protective of the environment because it provides for contaminated sediment removal and off-site disposal of hazardous and nonhazardous sediments. Relative to other removal action alternatives, it is also considered implementable and cost effective.

9.0 REFERENCES

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APPENDIX A

SEDIMENT DATA SUMMARY

APPENDIX A

EXPLANATORY NOTES

ERL	Effects range low from NOAA Quick Reference Cards Screening Guidelines for Inorganics & Organics, HAZMAT Report, NOAA, Aug. 1994.
>	Analyte value greater than ERL or background.
Background	From Hunters Point Annex Ambient Levels for Soil, Table 8, appendix H, Calculations of Hunters Point Ambient Levels, PRC, April 11, 1995.
> <	pH level between acidity and alkalinity limits of 2 and 12.5.
*	Indicates analyte value exceeds both ERL and background.

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

RCEL B
TATION COUNT 9

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR26	PA26SW03	MERCURY	5.000	MG/KG	>	0.15	>	2.28	*
IR26	PA26SW03	ARSENIC	3.900	MG/KG		8.20			
IR26	PA26SW03	SELENIUM	0.690	MG/KG				1.95	
IR26	PA26SW03	ALUMINUM	8960.000	MG/KG					
IR26	PA26SW03	BARIUM	105.000	MG/KG				314.36	
IR26	PA26SW03	CADMIUM	1.200	MG/KG	>	1.20		3.14	
IR26	PA26SW03	CALCIUM	12200.000	MG/KG					
IR26	PA26SW03	CHROMIUM	140.000	MG/KG	>	81.00			
IR26	PA26SW03	COBALT	12.900	MG/KG					
IR26	PA26SW03	COPPER	444.000	MG/KG	>	34.00	>	124.31	*
IR26	PA26SW03	IRON	30100.000	MG/KG					
IR26	PA26SW03	LEAD	840.000	MG/KG	>	46.70	>	8.99	*
IR26	PA26SW03	MAGNESIUM	7870.000	MG/KG					
IR26	PA26SW03	MANGANESE	728.000	MG/KG					
IR26	PA26SW03	MOLYBDENUM	5.300	MG/KG			>	2.68	
IR26	PA26SW03	NICKEL	84.700	MG/KG	>	20.90			
IR26	PA26SW03	POTASSIUM	1070.000	MG/KG					
IR26	PA26SW03	SILVER	1.100	MG/KG	>	1.00		1.43	
IR26	PA26SW03	SODIUM	408.000	MG/KG					
IR26	PA26SW03	VANADIUM	50.500	MG/KG				117.17	
IR26	PA26SW03	ZINC	1460.000	MG/KG	>	150.00	>	109.86	*
IR26	PA26SW03	ALPHA-CHLORDANE	15.000	UG/KG					
IR26	PA26SW03	AROCLOR-1260	970.000	UG/KG	>	22.70			
IR26	PA26SW03	BENZO(A)ANTHRACENE	1100.000	UG/KG	>	261.00			
IR26	PA26SW03	BENZO(B)FLUORANTHENE	1500.000	UG/KG					
IR26	PA26SW03	BENZO(K)FLUORANTHENE	580.000	UG/KG					
IR26	PA26SW03	CHRYSENE	1100.000	UG/KG	>	384.00			
IR26	PA26SW03	FLUORANTHENE	3000.000	UG/KG	>	600.00			
IR26	PA26SW03	PHENANTHRENE	1800.000	UG/KG	>	240.00			
IR26	PA26SW03	PYRENE	940.000	UG/KG	>	668.00			
IR26	PA26SW03	PH	7.400	PH		><		><	
IR26	PA26SW03	TOTAL OIL & GREASE	25000.000	MG/KG					
IR26	PA26SW03	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	1300.000	MG/KG					
IR26	PA26SW04	MERCURY	0.920	MG/KG	>	0.15		2.28	
IR26	PA26SW04	ARSENIC	4.200	MG/KG		8.20			
IR26	PA26SW04	ALUMINUM	7340.000	MG/KG					
IR26	PA26SW04	BARIUM	113.000	MG/KG				314.36	
IR26	PA26SW04	CADMIUM	2.000	MG/KG	>	1.20		3.14	
IR26	PA26SW04	CALCIUM	14300.000	MG/KG					
IR26	PA26SW04	CHROMIUM	197.000	MG/KG	>	81.00			
IR26	PA26SW04	COBALT	11.600	MG/KG					
IR26	PA26SW04	COPPER	494.000	MG/KG	>	34.00	>	124.31	*
IR26	PA26SW04	IRON	40500.000	MG/KG					
IR26	PA26SW04	LEAD	665.000	MG/KG	>	46.70	>	8.99	*
IR26	PA26SW04	MAGNESIUM	8120.000	MG/KG					
IR26	PA26SW04	MANGANESE	537.000	MG/KG					
IR26	PA26SW04	NICKEL	104.000	MG/KG	>	20.90			
IR26	PA26SW04	POTASSIUM	756.000	MG/KG					
IR26	PA26SW04	SILVER	1.000	MG/KG		1.00		1.43	
IR26	PA26SW04	SODIUM	511.000	MG/KG					
IR26	PA26SW04	VANADIUM	33.300	MG/KG				117.17	
IR26	PA26SW04	ZINC	506.000	MG/KG	>	150.00	>	109.86	*
IR26	PA26SW04	4,4'-DDD	42.000	UG/KG					
IR26	PA26SW04	AROCLOR-1242	300.000	UG/KG	>	22.70			
IR26	PA26SW04	AROCLOR-1260	1200.000	UG/KG	>	22.70			
IR26	PA26SW04	GAMMA-CHLORDANE	14.000	UG/KG					
IR26	PA26SW04	BENZO(A)ANTHRACENE	870.000	UG/KG	>	261.00			
IR26	PA26SW04	BENZO(B)FLUORANTHENE	700.000	UG/KG					
IR26	PA26SW04	FLUORANTHENE	970.000	UG/KG	>	600.00			
IR26	PA26SW04	PHENANTHRENE	540.000	UG/KG	>	240.00			
IR26	PA26SW04	PYRENE	1100.000	UG/KG	>	668.00			
IR26	PA26SW04	CARBON DISULFIDE	3.000	UG/KG					
IR26	PA26SW04	XYLENE (TOTAL)	2.000	UG/KG					
IR26	PA26SW04	PH	8.800	PH		><		><	
IR26	PA26SW04	TOTAL OIL & GREASE	81000.000	MG/KG					
IR26	PA26SW04	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	3400.000	MG/KG					

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL B
STATION COUNT 9

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR26	PA26SW04	TPH-PURGEABLE UNKNOWN HYDROCARBON	290.000	MG/KG					
IR26	PA26SW05	MERCURY	1.600	MG/KG	>	0.15		2.28	
IR26	PA26SW05	ARSENIC	6.000	MG/KG		8.20			
IR26	PA26SW05	PYRENE	0.880	MG/KG	>	0.67			
IR26	PA26SW05	ALUMINUM	8410.000	MG/KG					
IR26	PA26SW05	BARIUM	194.000	MG/KG				314.36	
IR26	PA26SW05	CADMIUM	0.800	MG/KG		1.20		3.14	
IR26	PA26SW05	CALCIUM	7140.000	MG/KG					
IR26	PA26SW05	CHROMIUM	172.000	MG/KG	>	81.00			
IR26	PA26SW05	COBALT	21.000	MG/KG					
IR26	PA26SW05	COPPER	759.000	MG/KG	>	34.00	>	124.31	*
IR26	PA26SW05	IRON	29500.000	MG/KG					
IR26	PA26SW05	LEAD	3190.000	MG/KG	>	46.70	>	8.99	*
IR26	PA26SW05	MAGNESIUM	20300.000	MG/KG					
IR26	PA26SW05	MANGANESE	851.000	MG/KG					
IR26	PA26SW05	NICKEL	179.000	MG/KG	>	20.90			
IR26	PA26SW05	POTASSIUM	960.000	MG/KG					
IR26	PA26SW05	SILVER	0.570	MG/KG		1.00		1.43	
IR26	PA26SW05	SODIUM	182.000	MG/KG					
IR26	PA26SW05	VANADIUM	34.500	MG/KG				117.17	
IR26	PA26SW05	ZINC	566.000	MG/KG	>	150.00	>	109.86	*
IR26	PA26SW05	4,4'-DDT	3.300	UG/KG	>	1.58			
IR26	PA26SW05	AROCLOR-1260	150.000	UG/KG	>	22.70			
IR26	PA26SW05	4-METHYLPHENOL	86.000	UG/KG					
IR26	PA26SW05	ANTHRACENE	110.000	UG/KG	>	85.30			
IR26	PA26SW05	BENZO(A)ANTHRACENE	370.000	UG/KG	>	261.00			
IR26	PA26SW05	BENZO(A)PYRENE	320.000	UG/KG		430.00			
IR26	PA26SW05	BENZO(B)FLUORANTHENE	620.000	UG/KG					
IR26	PA26SW05	BENZO(G,H,I)PERYLENE	190.000	UG/KG					
IR26	PA26SW05	BENZO(K)FLUORANTHENE	230.000	UG/KG					
IR26	PA26SW05	CARBAZOLE	100.000	UG/KG					
IR26	PA26SW05	CHRYSENE	490.000	UG/KG	>	384.00			
IR26	PA26SW05	FLUORANTHENE	990.000	UG/KG	>	600.00			
IR26	PA26SW05	INDENO(1,2,3-CD)PYRENE	220.000	UG/KG					
IR26	PA26SW05	PHENANTHRENE	810.000	UG/KG	>	240.00			
IR26	PA26SW05	PYRENE	760.000	UG/KG	>	668.00			
IR26	PA26SW05	PH	6.300	PH		><		><	
IR26	PA26SW05	TOTAL OIL & GREASE	3200.000	MG/KG					
IR26	PA26SW05	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	39.000	MG/KG					
IR50	PA50CB200	% SOLIDS	75.200	%					
IR50	PA50CB200	MERCURY	3.590	MG/KG	>	0.15	>	2.28	*
IR50	PA50CB200	ARSENIC	20.620	MG/KG	>	8.20			
IR50	PA50CB200	ALUMINUM	5348.620	MG/KG					
IR50	PA50CB200	ANTIMONY	258.360	MG/KG			>	9.05	
IR50	PA50CB200	BARIUM	131.020	MG/KG				314.36	
IR50	PA50CB200	CADMIUM	20.860	MG/KG	>	1.20	>	3.14	*
IR50	PA50CB200	CALCIUM	12790.100	MG/KG					
IR50	PA50CB200	CHROMIUM	443.930	MG/KG	>	81.00			
IR50	PA50CB200	COBALT	17.490	MG/KG					
IR50	PA50CB200	COPPER	720.360	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB200	IRON	57713.100	MG/KG					
IR50	PA50CB200	LEAD	1720.550	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB200	MAGNESIUM	5414.900	MG/KG					
IR50	PA50CB200	MANGANESE	384.080	MG/KG					
IR50	PA50CB200	NICKEL	181.600	MG/KG	>	20.90			
IR50	PA50CB200	POTASSIUM	504.500	MG/KG					
IR50	PA50CB200	SILVER	190.250	MG/KG	>	1.00	>	1.43	*
IR50	PA50CB200	VANADIUM	49.490	MG/KG				117.17	
IR50	PA50CB200	ZINC	1721.600	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB200	AROCLOR-1260	39000.000	UG/KG	>	22.70			
IR50	PA50CB200	TETRACHLOROETHENE	942.300	UG/KG					
IR50	PA50CB200	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	6000.000	MG/KG					
IR50	PA50CB200	PH	6.900	PH		><		><	
IR50	PA50CB200	TPH-DIESEL	2300.000	MG/KG					
IR50	PA50CB206	% SOLIDS	77.700	%					
IR50	PA50CB206	MERCURY	0.800	MG/KG	>	0.15		2.28	

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

ARCEL B
STATION COUNT 9

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50CB206	ARSENIC	8.970	MG/KG	>	8.20			
IR50	PA50CB206	ALUMINUM	7248.590	MG/KG					
IR50	PA50CB206	ANTIMONY	21.060	MG/KG			>	9.05	
IR50	PA50CB206	BARIUM	249.300	MG/KG				314.36	
IR50	PA50CB206	CADMIUM	11.430	MG/KG	>	1.20	>	3.14	*
IR50	PA50CB206	CALCIUM	20433.000	MG/KG					
IR50	PA50CB206	CHROMIUM	102.040	MG/KG	>	81.00			
IR50	PA50CB206	COBALT	15.760	MG/KG					
IR50	PA50CB206	COPPER	672.700	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB206	IRON	50424.600	MG/KG					
IR50	PA50CB206	LEAD	480.620	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB206	MAGNESIUM	6477.180	MG/KG					
IR50	PA50CB206	MANGANESE	642.930	MG/KG					
IR50	PA50CB206	MOLYBDENUM	14.720	MG/KG			>	2.68	
IR50	PA50CB206	NICKEL	95.110	MG/KG	>	20.90			
IR50	PA50CB206	POTASSIUM	742.490	MG/KG					
IR50	PA50CB206	SILVER	3.150	MG/KG	>	1.00	>	1.43	*
IR50	PA50CB206	SODIUM	460.610	MG/KG					
IR50	PA50CB206	VANADIUM	61.260	MG/KG				117.17	
IR50	PA50CB206	ZINC	865.290	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB206	AROCLOR-1260	1000.000	UG/KG	>	22.70			
IR50	PA50CB206	ANTHRACENE	75.680	UG/KG		85.30			
IR50	PA50CB206	BENZO(A)ANTHRACENE	236.700	UG/KG		261.00			
IR50	PA50CB206	BENZO(K)FLUORANTHENE	573.360	UG/KG					
IR50	PA50CB206	CHRYSENE	696.140	UG/KG	>	384.00			
IR50	PA50CB206	FLUORANTHENE	530.310	UG/KG		600.00			
IR50	PA50CB206	PHENANTHRENE	392.510	UG/KG	>	240.00			
IR50	PA50CB206	PYRENE	507.210	UG/KG		668.00			
IR50	PA50CB206	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	910.000	MG/KG					
IR50	PA50CB206	PH	7.400	PH		><		><	
IR50	PA50CB206	TPH-DIESEL	410.000	MG/KG					
IR50	PA50FC211	% SOLIDS	58.200	%					
IR50	PA50FC211	MERCURY	3.650	MG/KG	>	0.15	>	2.28	*
IR50	PA50FC211	ARSENIC	5.730	MG/KG		8.20			
IR50	PA50FC211	ALUMINUM	7969.910	MG/KG					
IR50	PA50FC211	ANTIMONY	5.140	MG/KG				9.05	
IR50	PA50FC211	BARIUM	73.770	MG/KG				314.36	
IR50	PA50FC211	CALCIUM	14215.600	MG/KG					
IR50	PA50FC211	CHROMIUM	182.500	MG/KG	>	81.00			
IR50	PA50FC211	COBALT	28.180	MG/KG					
IR50	PA50FC211	COPPER	117.280	MG/KG	>	34.00		124.31	
IR50	PA50FC211	IRON	25742.000	MG/KG					
IR50	PA50FC211	LEAD	383.810	MG/KG	>	46.70	>	8.99	*
IR50	PA50FC211	MAGNESIUM	29539.300	MG/KG					
IR50	PA50FC211	MANGANESE	389.410	MG/KG					
IR50	PA50FC211	NICKEL	412.410	MG/KG	>	20.90			
IR50	PA50FC211	POTASSIUM	1335.120	MG/KG					
IR50	PA50FC211	SILVER	12.350	MG/KG	>	1.00	>	1.43	*
IR50	PA50FC211	VANADIUM	36.760	MG/KG				117.17	
IR50	PA50FC211	ZINC	934.690	MG/KG	>	150.00	>	109.86	*
IR50	PA50FC211	AROCLOR-1260	660.000	UG/KG	>	22.70			
IR50	PA50FC211	BENZO(A)ANTHRACENE	11751.460	UG/KG	>	261.00			
IR50	PA50FC211	BENZO(B)FLUORANTHENE	5575.410	UG/KG					
IR50	PA50FC211	CHRYSENE	20813.090	UG/KG	>	384.00			
IR50	PA50FC211	FLUORANTHENE	16991.300	UG/KG	>	600.00			
IR50	PA50FC211	PYRENE	17284.580	UG/KG	>	668.00			
IR50	PA50FC211	CARBON DISULFIDE	5.130	UG/KG					
IR50	PA50FC211	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	690.000	MG/KG					
IR50	PA50FC211	PH	9.100	PH		><		><	
IR50	PA50FC211	TPH-DIESEL	180.000	MG/KG					
IR50	PA50FC212	% SOLIDS	72.500	%					
IR50	PA50FC212	CYANIDE	0.710	MG/KG					
IR50	PA50FC212	ARSENIC	5.530	MG/KG		8.20			
IR50	PA50FC212	ALUMINUM	5207.860	MG/KG					
IR50	PA50FC212	ANTIMONY	7.780	MG/KG				9.05	
IR50	PA50FC212	BARIUM	51.450	MG/KG				314.36	

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL B
STATION COUNT 9

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50FC212	CALCIUM	4697.080	MG/KG					
IR50	PA50FC212	CHROMIUM	124.940	MG/KG	>	81.00			
IR50	PA50FC212	COBALT	8.830	MG/KG					
IR50	PA50FC212	COPPER	66.190	MG/KG	>	34.00		124.31	
IR50	PA50FC212	IRON	15832.800	MG/KG					
IR50	PA50FC212	LEAD	194.590	MG/KG	>	46.70	>	8.99	*
IR50	PA50FC212	MAGNESIUM	6591.370	MG/KG					
IR50	PA50FC212	MANGANESE	173.740	MG/KG					
IR50	PA50FC212	NICKEL	74.710	MG/KG	>	20.90			
IR50	PA50FC212	POTASSIUM	656.830	MG/KG					
IR50	PA50FC212	SILVER	3.570	MG/KG	>	1.00	>	1.43	*
IR50	PA50FC212	VANADIUM	24.490	MG/KG				117.17	
IR50	PA50FC212	ZINC	327.860	MG/KG	>	150.00	>	109.86	*
IR50	PA50FC212	AROCLOR-1260	15000.000	UG/KG	>	22.70			
IR50	PA50FC212	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	670.000	MG/KG					
IR50	PA50FC212	PH	9.500	PH		><		><	
IR50	PA50FC212	TPH-DIESEL	680.000	MG/KG					
IR50	PA50SW201	% SOLIDS	50.600	%					
IR50	PA50SW201	MERCURY	0.610	MG/KG	>	0.15		2.28	
IR50	PA50SW201	ARSENIC	9.590	MG/KG	>	8.20			
IR50	PA50SW201	LEAD	418.670	MG/KG	>	46.70	>	8.99	*
IR50	PA50SW201	ALUMINUM	14012.100	MG/KG					
IR50	PA50SW201	ANTIMONY	8.710	MG/KG				9.05	
IR50	PA50SW201	BARIUM	88.450	MG/KG				314.36	
IR50	PA50SW201	CADMIUM	2.770	MG/KG	>	1.20		3.14	
IR50	PA50SW201	CALCIUM	26784.400	MG/KG					
IR50	PA50SW201	CHROMIUM	312.090	MG/KG	>	81.00			
IR50	PA50SW201	COBALT	16.820	MG/KG					
IR50	PA50SW201	COPPER	320.890	MG/KG	>	34.00	>	124.31	*
IR50	PA50SW201	IRON	32406.900	MG/KG					
IR50	PA50SW201	MAGNESIUM	17001.900	MG/KG					
IR50	PA50SW201	MANGANESE	368.220	MG/KG					
IR50	PA50SW201	NICKEL	183.210	MG/KG	>	20.90			
IR50	PA50SW201	POTASSIUM	2201.460	MG/KG					
IR50	PA50SW201	SILVER	1.910	MG/KG	>	1.00	>	1.43	*
IR50	PA50SW201	SODIUM	7356.340	MG/KG					
IR50	PA50SW201	VANADIUM	50.670	MG/KG				117.17	
IR50	PA50SW201	ZINC	671.850	MG/KG	>	150.00	>	109.86	*
IR50	PA50SW201	AROCLOR-1260	1100.000	UG/KG	>	22.70			
IR50	PA50SW201	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	86.000	MG/KG					
IR50	PA50SW201	PH	7.500	PH		><		><	
IR50	PA50SW201	TPH-DIESEL	1600.000	MG/KG					
IR50	PA50SW203	% SOLIDS	77.000	%					
IR50	PA50SW203	MERCURY	0.660	MG/KG	>	0.15		2.28	
IR50	PA50SW203	ARSENIC	4.690	MG/KG		8.20			
IR50	PA50SW203	ALUMINUM	5909.600	MG/KG					
IR50	PA50SW203	BARIUM	43.880	MG/KG				314.36	
IR50	PA50SW203	CALCIUM	12745.700	MG/KG					
IR50	PA50SW203	CHROMIUM	66.630	MG/KG		81.00			
IR50	PA50SW203	COBALT	7.530	MG/KG					
IR50	PA50SW203	COPPER	71.030	MG/KG	>	34.00		124.31	
IR50	PA50SW203	IRON	13276.200	MG/KG					
IR50	PA50SW203	LEAD	591.140	MG/KG	>	46.70	>	8.99	*
IR50	PA50SW203	MAGNESIUM	6650.520	MG/KG					
IR50	PA50SW203	MANGANESE	260.890	MG/KG					
IR50	PA50SW203	MOLYBDENUM	7.530	MG/KG			>	2.68	
IR50	PA50SW203	NICKEL	46.250	MG/KG	>	20.90			
IR50	PA50SW203	POTASSIUM	531.940	MG/KG					
IR50	PA50SW203	SILVER	2.230	MG/KG	>	1.00	>	1.43	*
IR50	PA50SW203	SODIUM	2780.000	MG/KG					
IR50	PA50SW203	VANADIUM	22.150	MG/KG				117.17	
IR50	PA50SW203	ZINC	226.730	MG/KG	>	150.00	>	109.86	*
IR50	PA50SW203	BENZO(A)ANTHRACENE	84.000	UG/KG		261.00			
IR50	PA50SW203	BENZO(B)FLUORANTHENE	219.100	UG/KG					
IR50	PA50SW203	CHRYSENE	207.830	UG/KG		384.00			
IR50	PA50SW203	PHENANTHRENE	146.490	UG/KG		240.00			

\RCEL B
.TATION COUNT 9

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50SW203	PYRENE	240.440	UG/KG		668.00			

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL C
STATION COUNT 19

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR28	PA28SW01	MERCURY	0.850	MG/KG	>	0.15		2.28	
IR28	PA28SW01	ARSENIC	8.520	MG/KG	>	8.20			
IR28	PA28SW01	ALUMINUM	6058.910	MG/KG					
IR28	PA28SW01	ANTIMONY	43.230	MG/KG			>	9.05	
IR28	PA28SW01	BARIUM	979.480	MG/KG			>	314.36	
IR28	PA28SW01	CADMIUM	61.520	MG/KG	>	1.20	>	3.14	*
IR28	PA28SW01	CALCIUM	9794.990	MG/KG					
IR28	PA28SW01	CHROMIUM	225.400	MG/KG	>	81.00			
IR28	PA28SW01	COBALT	16.710	MG/KG					
IR28	PA28SW01	COPPER	1401.060	MG/KG	>	34.00	>	124.31	*
IR28	PA28SW01	IRON	35298.300	MG/KG					
IR28	PA28SW01	LEAD	1768.610	MG/KG	>	46.70	>	8.99	*
IR28	PA28SW01	MAGNESIUM	6177.400	MG/KG					
IR28	PA28SW01	MANGANESE	357.590	MG/KG					
IR28	PA28SW01	MOLYBDENUM	28.200	MG/KG			>	2.68	
IR28	PA28SW01	NICKEL	169.260	MG/KG	>	20.90			
IR28	PA28SW01	POTASSIUM	856.930	MG/KG					
IR28	PA28SW01	SODIUM	2247.670	MG/KG					
IR28	PA28SW01	VANADIUM	45.500	MG/KG				117.17	
IR28	PA28SW01	ZINC	2752.320	MG/KG	>	150.00	>	109.86	*
IR28	PA28SW01	AROCLOR-1260	360.000	UG/KG	>	22.70			
IR28	PA28SW01	PH	8.900	PH		><		><	
IR28	PA28SW01	TOTAL OIL & GREASE	76000.000	MG/KG					
IR28	PA28SW01	TPH-DIESEL	12000.000	MG/KG					
IR28	PA28SW01	TPH-GASOLINE	34.000	MG/KG					
IR28	PA28SW22	CYANIDE	0.820	MG/KG					
IR28	PA28SW22	MERCURY	0.140	MG/KG		0.15		2.28	
IR28	PA28SW22	ARSENIC	3.700	MG/KG		8.20			
IR28	PA28SW22	SELENIUM	2.000	MG/KG			>	1.95	
IR28	PA28SW22	THALLIUM	0.690	MG/KG				0.81	
IR28	PA28SW22	ALUMINUM	8290.000	MG/KG					
IR28	PA28SW22	BARIUM	570.000	MG/KG			>	314.36	
IR28	PA28SW22	CADMIUM	12.000	MG/KG	>	1.20	>	3.14	*
IR28	PA28SW22	CALCIUM	6820.000	MG/KG					
IR28	PA28SW22	CHROMIUM	173.000	MG/KG	>	81.00			
IR28	PA28SW22	COBALT	74.600	MG/KG					
IR28	PA28SW22	COPPER	862.000	MG/KG	>	34.00	>	124.31	*
IR28	PA28SW22	IRON	50300.000	MG/KG					
IR28	PA28SW22	LEAD	883.000	MG/KG	>	46.70	>	8.99	*
IR28	PA28SW22	MAGNESIUM	143000.000	MG/KG					
IR28	PA28SW22	MANGANESE	628.000	MG/KG					
IR28	PA28SW22	NICKEL	1320.000	MG/KG	>	20.90			
IR28	PA28SW22	POTASSIUM	689.000	MG/KG					
IR28	PA28SW22	SILVER	1.600	MG/KG	>	1.00	>	1.43	*
IR28	PA28SW22	SODIUM	909.000	MG/KG					
IR28	PA28SW22	VANADIUM	20.000	MG/KG				117.17	
IR28	PA28SW22	ZINC	1160.000	MG/KG	>	150.00	>	109.86	*
IR28	PA28SW22	2-METHYLNAPHTHALENE	4100.000	UG/KG	>	70.00			
IR28	PA28SW22	NAPHTHALENE	3600.000	UG/KG	>	160.00			
IR28	PA28SW22	PHENANTHRENE	2500.000	UG/KG	>	240.00			
IR28	PA28SW22	XYLENE (TOTAL)	9500.000	UG/KG					
IR28	PA28SW22	PH	7.900	PH		><		><	
IR28	PA28SW22	TOTAL OIL & GREASE	33000.000	MG/KG					
IR28	PA28SW22	TPH-DIESEL	5200.000	MG/KG					
IR28	PA28SW22	TPH-PURGEABLE UNKNOWN HYDROCARBON	2100.000	MG/KG					
IR28	PA28SW66	MERCURY	2.200	MG/KG	>	0.15		2.28	
IR28	PA28SW66	ARSENIC	18.700	MG/KG	>	8.20			
IR28	PA28SW66	ALUMINUM	11000.000	MG/KG					
IR28	PA28SW66	ANTIMONY	205.000	MG/KG			>	9.05	
IR28	PA28SW66	BARIUM	4470.000	MG/KG			>	314.36	
IR28	PA28SW66	CADMIUM	15.700	MG/KG	>	1.20	>	3.14	*
IR28	PA28SW66	CALCIUM	19400.000	MG/KG					
IR28	PA28SW66	CHROMIUM	4470.000	MG/KG	>	81.00			
IR28	PA28SW66	COBALT	42.700	MG/KG					
IR28	PA28SW66	COPPER	24100.000	MG/KG	>	34.00	>	124.31	*
IR28	PA28SW66	IRON	53800.000	MG/KG					
IR28	PA28SW66	LEAD	14600.000	MG/KG	>	46.70	>	8.99	*

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

\RCEL C
TATION COUNT 19

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR28	PA28SW66	MAGNESIUM	8430.000	MG/KG					
IR28	PA28SW66	ARSENIC	515.000	MG/KG	>	8.20			
IR28	PA28SW66	MOLYBDENUM	104.000	MG/KG			>	2.68	
IR28	PA28SW66	NICKEL	134.000	MG/KG	>	20.90			
IR28	PA28SW66	POTASSIUM	2060.000	MG/KG					
IR28	PA28SW66	SODIUM	401.000	MG/KG					
IR28	PA28SW66	VANADIUM	202.000	MG/KG			>	117.17	
IR28	PA28SW66	ZINC	11600.000	MG/KG	>	150.00	>	109.86	*
IR28	PA28SW66	AROCLOR-1260	350.000	UG/KG	>	22.70			
IR28	PA28SW66	FLUORANTHENE	15000.000	UG/KG	>	600.00			
IR28	PA28SW66	NAPHTHALENE	21000.000	UG/KG	>	160.00			
IR28	PA28SW66	PHENANTHRENE	12000.000	UG/KG	>	240.00			
IR28	PA28SW66	PHENOL	11000.000	UG/KG					
IR28	PA28SW66	PYRENE	9200.000	UG/KG	>	668.00			
IR28	PA28SW66	TETRACHLOROETHENE	67000000.000	UG/KG					
IR28	PA28SW66	PH	6.200	PH		><		><	
IR28	PA28SW66	TOTAL OIL & GREASE	68000.000	MG/KG					
IR28	PA28SW66	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	5500.000	MG/KG					
IR28	PA28SW66	TPH-PURGEABLE UNKNOWN HYDROCARBON	18000.000	MG/KG					
IR29	PA29SW09	MERCURY	0.480	MG/KG	>	0.15		2.28	
IR29	PA29SW09	ARSENIC	7.500	MG/KG		8.20			
IR29	PA29SW09	ALUMINUM	10400.000	MG/KG					
IR29	PA29SW09	BARIUM	298.000	MG/KG				314.36	
IR29	PA29SW09	CADMIUM	5.300	MG/KG	>	1.20	>	3.14	*
IR29	PA29SW09	CALCIUM	9940.000	MG/KG					
IR29	PA29SW09	CHROMIUM	216.000	MG/KG	>	81.00			
IR29	PA29SW09	COBALT	17.600	MG/KG					
IR29	PA29SW09	COPPER	1190.000	MG/KG	>	34.00	>	124.31	*
IR29	PA29SW09	IRON	52700.000	MG/KG					
IR29	PA29SW09	LEAD	1430.000	MG/KG	>	46.70	>	8.99	*
IR29	PA29SW09	MAGNESIUM	10300.000	MG/KG					
IR29	PA29SW09	MANGANESE	707.000	MG/KG					
IR29	PA29SW09	MOLYBDENUM	14.600	MG/KG			>	2.68	
IR29	PA29SW09	NICKEL	192.000	MG/KG	>	20.90			
IR29	PA29SW09	POTASSIUM	778.000	MG/KG					
IR29	PA29SW09	SILVER	2.800	MG/KG	>	1.00	>	1.43	*
IR29	PA29SW09	SODIUM	264.000	MG/KG					
IR29	PA29SW09	VANADIUM	39.600	MG/KG				117.17	
IR29	PA29SW09	ZINC	1710.000	MG/KG	>	150.00	>	109.86	*
IR29	PA29SW09	4,4'-DDE	3.100	UG/KG	>	2.20			
IR29	PA29SW09	4,4'-DDT	11.000	UG/KG	>	1.58			
IR29	PA29SW09	AROCLOR-1254	120.000	UG/KG	>	22.70			
IR29	PA29SW09	AROCLOR-1260	200.000	UG/KG	>	22.70			
IR29	PA29SW09	DIELDRIN	2.100	UG/KG					
IR29	PA29SW09	GAMMA-CHLORDANE	1.300	UG/KG					
IR29	PA29SW09	BENZO(A)ANTHRACENE	630.000	UG/KG	>	261.00			
IR29	PA29SW09	BENZO(A)PYRENE	560.000	UG/KG	>	430.00			
IR29	PA29SW09	BENZO(B)FLUORANTHENE	1200.000	UG/KG					
IR29	PA29SW09	BENZO(G,H,I)PERYLENE	440.000	UG/KG					
IR29	PA29SW09	CHRYSENE	710.000	UG/KG	>	384.00			
IR29	PA29SW09	FLUORANTHENE	1500.000	UG/KG	>	600.00			
IR29	PA29SW09	INDENO(1,2,3-CD)PYRENE	430.000	UG/KG					
IR29	PA29SW09	PHENANTHRENE	810.000	UG/KG	>	240.00			
IR29	PA29SW09	PYRENE	860.000	UG/KG	>	668.00			
IR29	PA29SW09	2-HEXANONE	9.000	UG/KG					
IR29	PA29SW09	4-METHYL-2-PENTANONE	5.000	UG/KG					
IR29	PA29SW09	PH	6.600	PH		><		><	
IR29	PA29SW09	TOTAL OIL & GREASE	6200.000	MG/KG					
IR29	PA29SW09	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	81.000	MG/KG					
IR29	PA29SW18	MERCURY	0.420	MG/KG	>	0.15		2.28	
IR29	PA29SW18	ARSENIC	10.200	MG/KG	>	8.20			
IR29	PA29SW18	ALUMINUM	54900.000	MG/KG					
IR29	PA29SW18	ANTIMONY	14.300	MG/KG			>	9.05	
IR29	PA29SW18	BARIUM	672.000	MG/KG			>	314.36	
IR29	PA29SW18	CADMIUM	8.900	MG/KG	>	1.20	>	3.14	*
IR29	PA29SW18	CALCIUM	7890.000	MG/KG					
IR29	PA29SW18	CHROMIUM	321.000	MG/KG	>	81.00			

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL C
STATION COUNT 19

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR29	PA29SW18	COBALT	43.200	MG/KG					
IR29	PA29SW18	COPPER	1470.000	MG/KG	>	34.00	>	124.31	*
IR29	PA29SW18	IRON	74800.000	MG/KG					
IR29	PA29SW18	LEAD	1320.000	MG/KG	>	46.70	>	8.99	*
IR29	PA29SW18	MAGNESIUM	64100.000	MG/KG					
IR29	PA29SW18	MANGANESE	735.000	MG/KG					
IR29	PA29SW18	MOLYBDENUM	35.100	MG/KG			>	2.68	
IR29	PA29SW18	NICKEL	661.000	MG/KG	>	20.90			
IR29	PA29SW18	POTASSIUM	494.000	MG/KG					
IR29	PA29SW18	SILVER	2.000	MG/KG	>	1.00	>	1.43	*
IR29	PA29SW18	SODIUM	234.000	MG/KG					
IR29	PA29SW18	VANADIUM	31.500	MG/KG				117.17	
IR29	PA29SW18	ZINC	9250.000	MG/KG	>	150.00	>	109.86	*
IR29	PA29SW18	AROCLOR-1260	1200.000	UG/KG	>	22.70			
IR29	PA29SW18	BENZO(A)ANTHRACENE	210.000	UG/KG		261.00			
IR29	PA29SW18	BENZO(A)PYRENE	220.000	UG/KG		430.00			
IR29	PA29SW18	BENZO(B)FLUORANTHENE	520.000	UG/KG					
IR29	PA29SW18	BENZO(K)FLUORANTHENE	190.000	UG/KG					
IR29	PA29SW18	CHRYSENE	390.000	UG/KG	>	384.00			
IR29	PA29SW18	FLUORANTHENE	590.000	UG/KG		600.00			
IR29	PA29SW18	INDENO(1,2,3-CD)PYRENE	200.000	UG/KG					
IR29	PA29SW18	PHENANTHRENE	490.000	UG/KG	>	240.00			
IR29	PA29SW18	PYRENE	620.000	UG/KG		668.00			
IR29	PA29SW18	TOLUENE	2.000	UG/KG					
IR29	PA29SW18	XYLENE (TOTAL)	4.000	UG/KG					
IR29	PA29SW18	PH	6.500	PH		><		><	
IR29	PA29SW18	TOTAL OIL & GREASE	8500.000	MG/KG					
IR29	PA29SW18	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	910.000	MG/KG					
IR29	PA29SW21	% SOLIDS	74.500	%					
IR29	PA29SW21	MERCURY	0.100	MG/KG		0.15		2.28	
IR29	PA29SW21	ARSENIC	6.220	MG/KG		8.20			
IR29	PA29SW21	ALUMINUM	9345.520	MG/KG					
IR29	PA29SW21	BARIUM	1431.240	MG/KG			>	314.36	
IR29	PA29SW21	CADMIUM	2.820	MG/KG	>	1.20		3.14	
IR29	PA29SW21	CALCIUM	18495.200	MG/KG					
IR29	PA29SW21	CHROMIUM	219.830	MG/KG	>	81.00			
IR29	PA29SW21	COBALT	22.920	MG/KG					
IR29	PA29SW21	COPPER	1434.600	MG/KG	>	34.00	>	124.31	*
IR29	PA29SW21	IRON	44522.800	MG/KG					
IR29	PA29SW21	LEAD	319.760	MG/KG	>	46.70	>	8.99	*
IR29	PA29SW21	MAGNESIUM	9025.370	MG/KG					
IR29	PA29SW21	MANGANESE	684.750	MG/KG					
IR29	PA29SW21	MOLYBDENUM	89.590	MG/KG			>	2.68	
IR29	PA29SW21	NICKEL	1118.730	MG/KG	>	20.90			
IR29	PA29SW21	POTASSIUM	1002.290	MG/KG					
IR29	PA29SW21	SILVER	1.930	MG/KG	>	1.00	>	1.43	*
IR29	PA29SW21	SODIUM	249.060	MG/KG					
IR29	PA29SW21	VANADIUM	38.400	MG/KG				117.17	
IR29	PA29SW21	ZINC	1088.660	MG/KG	>	150.00	>	109.86	*
IR29	PA29SW21	2-CHLOROPHENOL	35118.050	UG/KG					
IR29	PA29SW21	4-CHLORO-3-METHYLPHENOL	24132.920	UG/KG					
IR29	PA29SW21	PHENOL	28700.600	UG/KG					
IR29	PA29SW21	PH	8.500	PH		><		><	
IR29	PA29SW21	TOTAL OIL & GREASE	28000.000	MG/KG					
IR29	PA29SW21	TPH-DIESEL	3700.000	MG/KG					
IR29	PA29SW29	% SOLIDS	74.800	%					
IR29	PA29SW29	MERCURY	0.160	MG/KG	>	0.15		2.28	
IR29	PA29SW29	ARSENIC	7.400	MG/KG		8.20			
IR29	PA29SW29	ALUMINUM	10955.100	MG/KG					
IR29	PA29SW29	BARIUM	218.380	MG/KG				314.36	
IR29	PA29SW29	CADMIUM	2.980	MG/KG	>	1.20		3.14	
IR29	PA29SW29	CALCIUM	8408.970	MG/KG					
IR29	PA29SW29	CHROMIUM	409.890	MG/KG	>	81.00			
IR29	PA29SW29	COBALT	38.520	MG/KG					
IR29	PA29SW29	COPPER	4205.400	MG/KG	>	34.00	>	124.31	*
IR29	PA29SW29	IRON	59268.100	MG/KG					
IR29	PA29SW29	LEAD	841.180	MG/KG	>	46.70	>	8.99	*

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

.RCEL C
STATION COUNT 19

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR29	PA29SW29	MAGNESIUM	8234.410	MG/KG					
IR29	PA29SW29	MANGANESE	663.000	MG/KG					
IR29	PA29SW29	MOLYBDENUM	201.160	MG/KG			>	2.68	
IR29	PA29SW29	NICKEL	4748.270	MG/KG	>	20.90			
IR29	PA29SW29	POTASSIUM	776.640	MG/KG					
IR29	PA29SW29	SILVER	2.520	MG/KG	>	1.00	>	1.43	*
IR29	PA29SW29	SODIUM	271.660	MG/KG					
IR29	PA29SW29	VANADIUM	41.780	MG/KG				117.17	
IR29	PA29SW29	ZINC	1708.940	MG/KG	>	150.00	>	109.86	*
IR29	PA29SW29	2-CHLOROPHENOL	9716.470	UG/KG					
IR29	PA29SW29	4-CHLORO-3-METHYLPHENOL	6579.540	UG/KG					
IR29	PA29SW29	PHENOL	14301.530	UG/KG					
IR29	PA29SW29	PH	7.600	PH		><		><	
IR29	PA29SW29	TOTAL OIL & GREASE	26000.000	MG/KG					
IR29	PA29SW29	TPH-DIESEL	1600.000	MG/KG					
IR50	PA50CB300	% SOLIDS	73.800	%					
IR50	PA50CB300	MERCURY	19.150	MG/KG	>	0.15	>	2.28	*
IR50	PA50CB300	ARSENIC	12.040	MG/KG	>	8.20			
IR50	PA50CB300	ALUMINUM	8082.140	MG/KG					
IR50	PA50CB300	ANTIMONY	9.960	MG/KG			>	9.05	
IR50	PA50CB300	BARIUM	338.770	MG/KG			>	314.36	
IR50	PA50CB300	BERYLLIUM	0.190	MG/KG				0.71	
IR50	PA50CB300	CADMIUM	8.540	MG/KG	>	1.20	>	3.14	*
IR50	PA50CB300	CALCIUM	35195.600	MG/KG					
IR50	PA50CB300	CHROMIUM	398.090	MG/KG	>	81.00			
IR50	PA50CB300	COBALT	26.150	MG/KG					
IR50	PA50CB300	COPPER	7335.730	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB300	IRON	38606.600	MG/KG					
IR50	PA50CB300	LEAD	2230.800	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB300	MAGNESIUM	9378.220	MG/KG					
IR50	PA50CB300	MANGANESE	480.760	MG/KG					
IR50	PA50CB300	MOLYBDENUM	28.580	MG/KG			>	2.68	
IR50	PA50CB300	NICKEL	444.840	MG/KG	>	20.90			
IR50	PA50CB300	POTASSIUM	796.700	MG/KG					
IR50	PA50CB300	SILVER	23.230	MG/KG	>	1.00	>	1.43	*
IR50	PA50CB300	SODIUM	290.230	MG/KG					
IR50	PA50CB300	VANADIUM	59.480	MG/KG				117.17	
IR50	PA50CB300	ZINC	1486.210	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB300	AROCLOR-1260	1900.000	UG/KG	>	22.70			
IR50	PA50CB300	FLUORANTHENE	550.000	UG/KG		600.00			
IR50	PA50CB300	PHENANTHRENE	426.270	UG/KG	>	240.00			
IR50	PA50CB300	PYRENE	524.520	UG/KG		668.00			
IR50	PA50CB300	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	110.000	MG/KG					
IR50	PA50CB300	PH	7.400	PH		><		><	
IR50	PA50CB300	TPH-DIESEL	210.000	MG/KG					
IR50	PA50CB301	% SOLIDS	76.400	%					
IR50	PA50CB301	CYANIDE	0.150	MG/KG					
IR50	PA50CB301	MERCURY	0.830	MG/KG	>	0.15		2.28	
IR50	PA50CB301	ARSENIC	5.430	MG/KG		8.20			
IR50	PA50CB301	ALUMINUM	13065.000	MG/KG					
IR50	PA50CB301	BARIUM	286.010	MG/KG				314.36	
IR50	PA50CB301	CADMIUM	9.710	MG/KG	>	1.20	>	3.14	*
IR50	PA50CB301	CALCIUM	7642.460	MG/KG					
IR50	PA50CB301	CHROMIUM	1344.480	MG/KG	>	81.00			
IR50	PA50CB301	COBALT	12.790	MG/KG					
IR50	PA50CB301	COPPER	1180.540	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB301	IRON	26370.600	MG/KG					
IR50	PA50CB301	LEAD	898.720	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB301	MAGNESIUM	8979.010	MG/KG					
IR50	PA50CB301	MANGANESE	338.110	MG/KG					
IR50	PA50CB301	MOLYBDENUM	10.910	MG/KG			>	2.68	
IR50	PA50CB301	NICKEL	179.780	MG/KG	>	20.90			
IR50	PA50CB301	POTASSIUM	886.730	MG/KG					
IR50	PA50CB301	SILVER	10.760	MG/KG	>	1.00	>	1.43	*
IR50	PA50CB301	SODIUM	2296.040	MG/KG					
IR50	PA50CB301	VANADIUM	54.500	MG/KG				117.17	
IR50	PA50CB301	ZINC	1770.910	MG/KG	>	150.00	>	109.86	*

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL C
STATION COUNT 19

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50CB301	ANTHRACENE	486.180	UG/KG	>	85.30			
IR50	PA50CB301	FLUORANTHENE	2879.360	UG/KG	>	600.00			
IR50	PA50CB301	PHENANTHRENE	2869.970	UG/KG	>	240.00			
IR50	PA50CB301	PYRENE	3184.900	UG/KG	>	668.00			
IR50	PA50CB301	CHLOROBENZENE	11542.700	UG/KG					
IR50	PA50CB301	ETHYLBENZENE	3609.770	UG/KG					
IR50	PA50CB301	XYLENE (TOTAL)	8646.720	UG/KG					
IR50	PA50CB301	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	5100.000	MG/KG					
IR50	PA50CB301	PH	9.200	PH		><		><	
IR50	PA50CB301	TPH-DIESEL	7200.000	MG/KG					
IR50	PA50CB301	TPH-GASOLINE	200.000	MG/KG					
IR50	PA50CB302	% SOLIDS	64.000	%					
IR50	PA50CB302	CYANIDE	0.220	MG/KG					
IR50	PA50CB302	MERCURY	5.380	MG/KG	>	0.15	>	2.28	*
IR50	PA50CB302	ARSENIC	58.520	MG/KG	>	8.20			
IR50	PA50CB302	ALUMINUM	10986.000	MG/KG					
IR50	PA50CB302	ANTIMONY	39.050	MG/KG			>	9.05	
IR50	PA50CB302	BARIUM	680.560	MG/KG			>	314.36	
IR50	PA50CB302	BERYLLIUM	0.260	MG/KG				0.71	
IR50	PA50CB302	CADMIUM	26.450	MG/KG	>	1.20	>	3.14	*
IR50	PA50CB302	CALCIUM	11218.500	MG/KG					
IR50	PA50CB302	CHROMIUM	753.760	MG/KG	>	81.00			
IR50	PA50CB302	COBALT	26.990	MG/KG					
IR50	PA50CB302	COPPER	2060.990	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB302	IRON	40475.200	MG/KG					
IR50	PA50CB302	LEAD	2532.310	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB302	MAGNESIUM	15134.700	MG/KG					
IR50	PA50CB302	MANGANESE	448.940	MG/KG					
IR50	PA50CB302	MOLYBDENUM	105.360	MG/KG			>	2.68	
IR50	PA50CB302	NICKEL	413.690	MG/KG	>	20.90			
IR50	PA50CB302	POTASSIUM	1473.400	MG/KG					
IR50	PA50CB302	SILVER	27.320	MG/KG	>	1.00	>	1.43	*
IR50	PA50CB302	SODIUM	2138.130	MG/KG					
IR50	PA50CB302	VANADIUM	82.600	MG/KG				117.17	
IR50	PA50CB302	ZINC	3461.440	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB302	AROCLOR-1260	3800.000	UG/KG	>	22.70			
IR50	PA50CB302	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	44000.000	MG/KG					
IR50	PA50CB302	PH	7.800	PH		><		><	
IR50	PA50CB302	TPH-DIESEL	17000.000	MG/KG					
IR50	PA50CB302	TPH-GASOLINE	78.000	MG/KG					
IR50	PA50CB304	% SOLIDS	79.200	%					
IR50	PA50CB304	MERCURY	1.450	MG/KG	>	0.15		2.28	
IR50	PA50CB304	ARSENIC	9.050	MG/KG	>	8.20			
IR50	PA50CB304	ALUMINUM	7759.760	MG/KG					
IR50	PA50CB304	ANTIMONY	25.500	MG/KG			>	9.05	
IR50	PA50CB304	BARIUM	550.800	MG/KG			>	314.36	
IR50	PA50CB304	CADMIUM	17.060	MG/KG	>	1.20	>	3.14	*
IR50	PA50CB304	CALCIUM	9942.650	MG/KG					
IR50	PA50CB304	CHROMIUM	235.720	MG/KG	>	81.00			
IR50	PA50CB304	COBALT	22.200	MG/KG					
IR50	PA50CB304	COPPER	3866.900	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB304	IRON	53284.100	MG/KG					
IR50	PA50CB304	LEAD	1388.600	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB304	MAGNESIUM	8130.670	MG/KG					
IR50	PA50CB304	MANGANESE	921.960	MG/KG					
IR50	PA50CB304	MOLYBDENUM	23.460	MG/KG			>	2.68	
IR50	PA50CB304	NICKEL	154.800	MG/KG	>	20.90			
IR50	PA50CB304	POTASSIUM	726.060	MG/KG					
IR50	PA50CB304	SILVER	10.710	MG/KG	>	1.00	>	1.43	*
IR50	PA50CB304	SODIUM	242.270	MG/KG					
IR50	PA50CB304	VANADIUM	47.190	MG/KG				117.17	
IR50	PA50CB304	ZINC	2849.180	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB304	AROCLOR-1260	6300.000	UG/KG	>	22.70			
IR50	PA50CB304	1,1,1-TRICHLOROETHANE	590.270	UG/KG					
IR50	PA50CB304	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	1200.000	MG/KG					
IR50	PA50CB304	PH	7.200	PH		><		><	
IR50	PA50CB304	TPH-DIESEL	160.000	MG/KG					

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

\RCEL C
TATION COUNT 19

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50CB305	% SOLIDS	65.600	%					
IR50	PA50CB305	MERCURY	0.980	MG/KG	>	0.15		2.28	
IR50	PA50CB305	ARSENIC	9.040	MG/KG	>	8.20			
IR50	PA50CB305	ALUMINUM	7638.230	MG/KG					
IR50	PA50CB305	ANTIMONY	54.140	MG/KG			>	9.05	
IR50	PA50CB305	BARIUM	207.950	MG/KG				314.36	
IR50	PA50CB305	CADMIUM	5.630	MG/KG	>	1.20	>	3.14	*
IR50	PA50CB305	CALCIUM	25244.500	MG/KG					
IR50	PA50CB305	CHROMIUM	330.860	MG/KG	>	81.00			
IR50	PA50CB305	COBALT	19.830	MG/KG					
IR50	PA50CB305	COPPER	1170.830	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB305	IRON	45315.200	MG/KG					
IR50	PA50CB305	LEAD	2224.590	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB305	MAGNESIUM	10028.900	MG/KG					
IR50	PA50CB305	MANGANESE	491.270	MG/KG					
IR50	PA50CB305	MOLYBDENUM	28.600	MG/KG			>	2.68	
IR50	PA50CB305	NICKEL	119.130	MG/KG	>	20.90			
IR50	PA50CB305	POTASSIUM	1179.420	MG/KG					
IR50	PA50CB305	SODIUM	4734.780	MG/KG					
IR50	PA50CB305	VANADIUM	44.020	MG/KG				117.17	
IR50	PA50CB305	ZINC	2516.150	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB305	AROCLOR-1260	1300.000	UG/KG	>	22.70			
IR50	PA50CB305	CARBON DISULFIDE	129.700	UG/KG					
IR50	PA50CB305	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	600.000	MG/KG					
IR50	PA50CB305	PH	9.500	PH		><		><	
IR50	PA50CB305	TPH-DIESEL	340.000	MG/KG					
IR50	PA50CB310	% SOLIDS	80.100	%					
IR50	PA50CB310	MERCURY	0.390	MG/KG	>	0.15		2.28	
IR50	PA50CB310	ARSENIC	9.120	MG/KG	>	8.20			
IR50	PA50CB310	ALUMINUM	8983.580	MG/KG					
IR50	PA50CB310	ANTIMONY	12.220	MG/KG			>	9.05	
IR50	PA50CB310	BARIUM	344.680	MG/KG			>	314.36	
IR50	PA50CB310	BERYLLIUM	0.220	MG/KG				0.71	
IR50	PA50CB310	CALCIUM	29571.700	MG/KG					
IR50	PA50CB310	CHROMIUM	134.730	MG/KG	>	81.00			
IR50	PA50CB310	COBALT	18.710	MG/KG					
IR50	PA50CB310	COPPER	1144.820	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB310	IRON	38824.300	MG/KG					
IR50	PA50CB310	LEAD	369.960	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB310	MAGNESIUM	8951.330	MG/KG					
IR50	PA50CB310	MANGANESE	596.680	MG/KG					
IR50	PA50CB310	MOLYBDENUM	71.030	MG/KG			>	2.68	
IR50	PA50CB310	NICKEL	76.250	MG/KG	>	20.90			
IR50	PA50CB310	POTASSIUM	1011.480	MG/KG					
IR50	PA50CB310	SILVER	1.160	MG/KG	>	1.00		1.43	
IR50	PA50CB310	SODIUM	307.190	MG/KG					
IR50	PA50CB310	VANADIUM	36.060	MG/KG				117.17	
IR50	PA50CB310	ZINC	1473.390	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB310	AROCLOR-1260	450.000	UG/KG	>	22.70			
IR50	PA50CB310	ETHYLBENZENE	140.880	UG/KG					
IR50	PA50CB310	TOLUENE	32.120	UG/KG					
IR50	PA50CB310	XYLENE (TOTAL)	416.670	UG/KG					
IR50	PA50CB310	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	860.000	MG/KG					
IR50	PA50CB310	PH	7.500	PH		><		><	
IR50	PA50CB310	TPH-DIESEL	330.000	MG/KG					
IR50	PA50CB310	TPH-GASOLINE	14.000	MG/KG					
IR50	PA50SW303	% SOLIDS	71.200	%					
IR50	PA50SW303	MERCURY	1.450	MG/KG	>	0.15		2.28	
IR50	PA50SW303	ARSENIC	5.240	MG/KG		8.20			
IR50	PA50SW303	ALUMINUM	7087.040	MG/KG					
IR50	PA50SW303	ANTIMONY	9.640	MG/KG			>	9.05	
IR50	PA50SW303	BARIUM	55.990	MG/KG				314.36	
IR50	PA50SW303	CADMIUM	4.050	MG/KG	>	1.20	>	3.14	*
IR50	PA50SW303	CALCIUM	7217.340	MG/KG					
IR50	PA50SW303	CHROMIUM	298.560	MG/KG	>	81.00			
IR50	PA50SW303	COBALT	10.910	MG/KG					
IR50	PA50SW303	COPPER	457.230	MG/KG	>	34.00	>	124.31	*

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL C
STATION COUNT 19

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50SW303	IRON	16481.600	MG/KG					
IR50	PA50SW303	LEAD	290.310	MG/KG	>	46.70	>	8.99	*
IR50	PA50SW303	MAGNESIUM	5637.520	MG/KG					
IR50	PA50SW303	MANGANESE	197.480	MG/KG					
IR50	PA50SW303	MOLYBDENUM	9.040	MG/KG			>	2.68	
IR50	PA50SW303	NICKEL	116.200	MG/KG	>	20.90			
IR50	PA50SW303	POTASSIUM	1088.840	MG/KG					
IR50	PA50SW303	SILVER	2.900	MG/KG	>	1.00	>	1.43	*
IR50	PA50SW303	SODIUM	3936.420	MG/KG					
IR50	PA50SW303	VANADIUM	51.430	MG/KG				117.17	
IR50	PA50SW303	ZINC	1256.620	MG/KG	>	150.00	>	109.86	*
IR50	PA50SW303	AROCLOR-1260	5400.000	UG/KG	>	22.70			
IR50	PA50SW303	2-BUTANONE	97.940	UG/KG					
IR50	PA50SW303	CARBON DISULFIDE	96.540	UG/KG					
IR50	PA50SW303	CHLOROBENZENE	1392.950	UG/KG					
IR50	PA50SW303	ETHYLBENZENE	62.860	UG/KG					
IR50	PA50SW303	TOLUENE	38.100	UG/KG					
IR50	PA50SW303	XYLENE (TOTAL)	358.250	UG/KG					
IR50	PA50SW303	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	12000.000	MG/KG					
IR50	PA50SW303	PH	7.400	PH		><		><	
IR50	PA50SW303	TPH-DIESEL	1300.000	MG/KG					
IR50	PA50SW303	TPH-GASOLINE	21.000	MG/KG					
IR50	PA50SW306	% SOLIDS	74.800	%					
IR50	PA50SW306	MERCURY	0.700	MG/KG	>	0.15		2.28	
IR50	PA50SW306	ARSENIC	7.710	MG/KG		8.20			
IR50	PA50SW306	LEAD	97.230	MG/KG	>	46.70	>	8.99	*
IR50	PA50SW306	ALUMINUM	6402.440	MG/KG					
IR50	PA50SW306	BARIUM	166.200	MG/KG				314.36	
IR50	PA50SW306	CALCIUM	15325.000	MG/KG					
IR50	PA50SW306	CHROMIUM	181.220	MG/KG	>	81.00			
IR50	PA50SW306	COBALT	14.990	MG/KG					
IR50	PA50SW306	COPPER	1005.990	MG/KG	>	34.00	>	124.31	*
IR50	PA50SW306	IRON	31079.900	MG/KG					
IR50	PA50SW306	MAGNESIUM	9235.710	MG/KG					
IR50	PA50SW306	MANGANESE	449.030	MG/KG					
IR50	PA50SW306	MOLYBDENUM	19.590	MG/KG			>	2.68	
IR50	PA50SW306	NICKEL	83.620	MG/KG	>	20.90			
IR50	PA50SW306	POTASSIUM	1062.390	MG/KG					
IR50	PA50SW306	SODIUM	2444.710	MG/KG					
IR50	PA50SW306	VANADIUM	30.800	MG/KG				117.17	
IR50	PA50SW306	ZINC	814.560	MG/KG	>	150.00	>	109.86	*
IR50	PA50SW306	AROCLOR-1260	510.000	UG/KG	>	22.70			
IR50	PA50SW306	PHENANTHRENE	681.520	UG/KG	>	240.00			
IR50	PA50SW306	PYRENE	1157.960	UG/KG	>	668.00			
IR50	PA50SW306	CARBON DISULFIDE	20.750	UG/KG					
IR50	PA50SW306	TETRACHLOROETHENE	7.700	UG/KG					
IR50	PA50SW306	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	150.000	MG/KG					
IR50	PA50SW306	PH	8.400	PH		><		><	
IR50	PA50SW306	TPH-DIESEL	170.000	MG/KG					
IR50	PA50SW307	% SOLIDS	82.200	%					
IR50	PA50SW307	MERCURY	0.200	MG/KG	>	0.15		2.28	
IR50	PA50SW307	ARSENIC	11.480	MG/KG	>	8.20			
IR50	PA50SW307	ALUMINUM	7616.900	MG/KG					
IR50	PA50SW307	BARIUM	183.120	MG/KG				314.36	
IR50	PA50SW307	BERYLLIUM	0.270	MG/KG				0.71	
IR50	PA50SW307	CALCIUM	14521.300	MG/KG					
IR50	PA50SW307	CHROMIUM	111.940	MG/KG	>	81.00			
IR50	PA50SW307	COBALT	16.130	MG/KG					
IR50	PA50SW307	COPPER	818.920	MG/KG	>	34.00	>	124.31	*
IR50	PA50SW307	IRON	29340.800	MG/KG					
IR50	PA50SW307	LEAD	268.580	MG/KG	>	46.70	>	8.99	*
IR50	PA50SW307	MAGNESIUM	8399.650	MG/KG					
IR50	PA50SW307	MANGANESE	426.810	MG/KG					
IR50	PA50SW307	MOLYBDENUM	103.380	MG/KG			>	2.68	
IR50	PA50SW307	NICKEL	406.960	MG/KG	>	20.90			
IR50	PA50SW307	POTASSIUM	746.450	MG/KG					
IR50	PA50SW307	SILVER	1.670	MG/KG	>	1.00	>	1.43	*

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

RCEL C
STATION COUNT 19

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50SW307	SODIUM	294.000	MG/KG					
IR50	PA50SW307	VANADIUM	25.940	MG/KG				117.17	
IR50	PA50SW307	ZINC	531.610	MG/KG	>	150.00	>	109.86	*
IR50	PA50SW307	AROCLOR-1260	180.000	UG/KG	>	22.70			
IR50	PA50SW307	TETRACHLOROETHENE	25.220	UG/KG					
IR50	PA50SW307	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	1000.000	MG/KG					
IR50	PA50SW307	PH	7.900	PH		><		><	
IR50	PA50SW307	TPH-DIESEL	110.000	MG/KG					
IR50	PA50SW308	% SOLIDS	83.600	%					
IR50	PA50SW308	MERCURY	0.410	MG/KG	>	0.15		2.28	
IR50	PA50SW308	ARSENIC	28.600	MG/KG	>	8.20			
IR50	PA50SW308	ALUMINUM	5903.620	MG/KG					
IR50	PA50SW308	ANTIMONY	3.530	MG/KG				9.05	
IR50	PA50SW308	BARIUM	136.580	MG/KG				314.36	
IR50	PA50SW308	BERYLLIUM	0.160	MG/KG				0.71	
IR50	PA50SW308	CALCIUM	10372.700	MG/KG					
IR50	PA50SW308	CHROMIUM	100.870	MG/KG	>	81.00			
IR50	PA50SW308	COBALT	23.170	MG/KG					
IR50	PA50SW308	COPPER	846.860	MG/KG	>	34.00	>	124.31	*
IR50	PA50SW308	IRON	40461.100	MG/KG					
IR50	PA50SW308	LEAD	497.590	MG/KG	>	46.70	>	8.99	*
IR50	PA50SW308	MAGNESIUM	9319.740	MG/KG					
IR50	PA50SW308	MANGANESE	357.730	MG/KG					
IR50	PA50SW308	MOLYBDENUM	128.220	MG/KG			>	2.68	
IR50	PA50SW308	NICKEL	876.540	MG/KG	>	20.90			
IR50	PA50SW308	POTASSIUM	929.560	MG/KG					
IR50	PA50SW308	SILVER	1.150	MG/KG	>	1.00		1.43	
IR50	PA50SW308	SODIUM	1394.270	MG/KG					
IR50	PA50SW308	VANADIUM	24.030	MG/KG				117.17	
IR50	PA50SW308	ZINC	571.190	MG/KG	>	150.00	>	109.86	*
IR50	PA50SW308	AROCLOR-1260	580.000	UG/KG	>	22.70			
IR50	PA50SW308	4-METHYL-2-PENTANONE	49.810	UG/KG					
IR50	PA50SW308	TRICHLOROETHENE	4.880	UG/KG					
IR50	PA50SW308	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	2800.000	MG/KG					
IR50	PA50SW308	PH	8.200	PH		><		><	
IR50	PA50SW308	TPH-DIESEL	970.000	MG/KG					
IR50	PA50SW309	% SOLIDS	50.800	%					
IR50	PA50SW309	MERCURY	0.500	MG/KG	>	0.15		2.28	
IR50	PA50SW309	ARSENIC	9.610	MG/KG	>	8.20			
IR50	PA50SW309	ALUMINUM	11087.200	MG/KG					
IR50	PA50SW309	ANTIMONY	9.110	MG/KG			>	9.05	
IR50	PA50SW309	BARIUM	625.780	MG/KG			>	314.36	
IR50	PA50SW309	BERYLLIUM	0.310	MG/KG				0.71	
IR50	PA50SW309	CADMIUM	28.800	MG/KG	>	1.20	>	3.14	*
IR50	PA50SW309	CALCIUM	5865.230	MG/KG					
IR50	PA50SW309	CHROMIUM	189.020	MG/KG	>	81.00			
IR50	PA50SW309	COBALT	52.680	MG/KG					
IR50	PA50SW309	COPPER	553.160	MG/KG	>	34.00	>	124.31	*
IR50	PA50SW309	IRON	42583.400	MG/KG					
IR50	PA50SW309	LEAD	812.820	MG/KG	>	46.70	>	8.99	*
IR50	PA50SW309	MAGNESIUM	91429.700	MG/KG					
IR50	PA50SW309	MANGANESE	412.100	MG/KG					
IR50	PA50SW309	MOLYBDENUM	25.420	MG/KG			>	2.68	
IR50	PA50SW309	NICKEL	869.470	MG/KG	>	20.90			
IR50	PA50SW309	POTASSIUM	2205.670	MG/KG					
IR50	PA50SW309	SILVER	1.900	MG/KG	>	1.00	>	1.43	*
IR50	PA50SW309	SODIUM	7650.180	MG/KG					
IR50	PA50SW309	VANADIUM	41.280	MG/KG				117.17	
IR50	PA50SW309	ZINC	1185.350	MG/KG	>	150.00	>	109.86	*
IR50	PA50SW309	XYLENE (TOTAL)	1668.570	UG/KG					
IR50	PA50SW309	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	1800.000	MG/KG					
IR50	PA50SW309	PH	7.700	PH		><		><	
IR50	PA50SW309	TPH-DIESEL	6300.000	MG/KG					
IR50	PA50SW309	TPH-GASOLINE	130.000	MG/KG					
IR58	PA58SW06	MERCURY	0.210	MG/KG	>	0.15		2.28	
IR58	PA58SW06	ARSENIC	5.100	MG/KG		8.20			
IR58	PA58SW06	ALUMINUM	7640.000	MG/KG					

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL C
STATION COUNT 19

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR58	PA58SW06	BARIUM	79.300	MG/KG				314.36	
IR58	PA58SW06	CADMIUM	2.200	MG/KG	>	1.20		3.14	
IR58	PA58SW06	CALCIUM	8230.000	MG/KG					
IR58	PA58SW06	CHROMIUM	114.000	MG/KG	>	81.00			
IR58	PA58SW06	COBALT	12.900	MG/KG					
IR58	PA58SW06	COPPER	219.000	MG/KG	>	34.00	>	124.31	*
IR58	PA58SW06	IRON	37000.000	MG/KG					
IR58	PA58SW06	LEAD	295.000	MG/KG	>	46.70	>	8.99	*
IR58	PA58SW06	MAGNESIUM	13700.000	MG/KG					
IR58	PA58SW06	MANGANESE	472.000	MG/KG					
IR58	PA58SW06	MOLYBDENUM	7.600	MG/KG			>	2.68	
IR58	PA58SW06	NICKEL	122.000	MG/KG	>	20.90			
IR58	PA58SW06	POTASSIUM	732.000	MG/KG					
IR58	PA58SW06	SODIUM	727.000	MG/KG					
IR58	PA58SW06	VANADIUM	32.000	MG/KG				117.17	
IR58	PA58SW06	ZINC	610.000	MG/KG	>	150.00	>	109.86	*
IR58	PA58SW06	AROCLOR-1260	19000.000	UG/KG	>	22.70			
IR58	PA58SW06	PHENANTHRENE	1200.000	UG/KG	>	240.00			
IR58	PA58SW06	PHENOL	1100.000	UG/KG					
IR58	PA58SW06	PYRENE	1100.000	UG/KG	>	668.00			
IR58	PA58SW06	1,2-DICHLOROETHENE (TOTAL)	360.000	UG/KG					
IR58	PA58SW06	CHLOROBENZENE	240.000	UG/KG					
IR58	PA58SW06	TOLUENE	7.000	UG/KG					
IR58	PA58SW06	VINYL CHLORIDE	63.000	UG/KG					
IR58	PA58SW06	XYLENE (TOTAL)	8.000	UG/KG					
IR58	PA58SW06	PH	7.300	PH		><		><	
IR58	PA58SW06	TOTAL OIL & GREASE	10000.000	MG/KG					
IR58	PA58SW06	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	3900.000	MG/KG					
IR58	PA58SW06	TPH-PURGEABLE UNKNOWN HYDROCARBON	3.100	MG/KG					

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

RCEL D
.ATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR33	PA33SW12	% SOLIDS	84.900	%					
IR33	PA33SW12	MERCURY	0.230	MG/KG	>	0.15		2.28	
IR33	PA33SW12	ARSENIC	3.800	MG/KG		8.20			
IR33	PA33SW12	ALUMINUM	5884.010	MG/KG					
IR33	PA33SW12	ANTIMONY	14.770	MG/KG			>	9.05	
IR33	PA33SW12	BARIUM	1008.420	MG/KG			>	314.36	
IR33	PA33SW12	BERYLLIUM	0.190	MG/KG				0.71	
IR33	PA33SW12	CADMIUM	11.900	MG/KG	>	1.20	>	3.14	*
IR33	PA33SW12	CALCIUM	7049.230	MG/KG					
IR33	PA33SW12	CHROMIUM	114.690	MG/KG	>	81.00			
IR33	PA33SW12	COBALT	14.340	MG/KG					
IR33	PA33SW12	COPPER	746.170	MG/KG	>	34.00	>	124.31	*
IR33	PA33SW12	IRON	34155.600	MG/KG					
IR33	PA33SW12	LEAD	1789.730	MG/KG	>	46.70	>	8.99	*
IR33	PA33SW12	MAGNESIUM	9840.750	MG/KG					
IR33	PA33SW12	MANGANESE	397.570	MG/KG					
IR33	PA33SW12	MOLYBDENUM	71.190	MG/KG			>	2.68	
IR33	PA33SW12	NICKEL	128.970	MG/KG	>	20.90			
IR33	PA33SW12	POTASSIUM	508.820	MG/KG					
IR33	PA33SW12	SILVER	6.440	MG/KG	>	1.00	>	1.43	*
IR33	PA33SW12	SODIUM	666.980	MG/KG					
IR33	PA33SW12	VANADIUM	21.180	MG/KG				117.17	
IR33	PA33SW12	ZINC	936.780	MG/KG	>	150.00	>	109.86	*
IR33	PA33SW12	AROCLOR-1260	380.000	UG/KG	>	22.70			
IR33	PA33SW12	TOTAL OIL & GREASE	10000.000	MG/KG					
IR33	PA33SW12	TPH-DIESEL	1400.000	MG/KG					
IR33	PA33SW12	TPH-GASOLINE	9900.000	MG/KG					
IR33	PA33SW14	% SOLIDS	60.200	%					
IR33	PA33SW14	MERCURY	1.990	MG/KG	>	0.15		2.28	
IR33	PA33SW14	ARSENIC	6.140	MG/KG		8.20			
IR33	PA33SW14	ALUMINUM	10201.000	MG/KG					
IR33	PA33SW14	ANTIMONY	18.200	MG/KG			>	9.05	
IR33	PA33SW14	BARIUM	1084.170	MG/KG			>	314.36	
IR33	PA33SW14	BERYLLIUM	0.370	MG/KG				0.71	
IR33	PA33SW14	CADMIUM	4.550	MG/KG	>	1.20	>	3.14	*
IR33	PA33SW14	CALCIUM	11235.100	MG/KG					
IR33	PA33SW14	CHROMIUM	243.580	MG/KG	>	81.00			
IR33	PA33SW14	COBALT	18.220	MG/KG					
IR33	PA33SW14	COPPER	828.930	MG/KG	>	34.00	>	124.31	*
IR33	PA33SW14	IRON	37409.700	MG/KG					
IR33	PA33SW14	LEAD	2049.790	MG/KG	>	46.70	>	8.99	*
IR33	PA33SW14	MAGNESIUM	12872.100	MG/KG					
IR33	PA33SW14	MANGANESE	515.250	MG/KG					
IR33	PA33SW14	MOLYBDENUM	8.110	MG/KG			>	2.68	
IR33	PA33SW14	NICKEL	129.580	MG/KG	>	20.90			
IR33	PA33SW14	POTASSIUM	1030.930	MG/KG					
IR33	PA33SW14	SODIUM	342.800	MG/KG					
IR33	PA33SW14	VANADIUM	43.570	MG/KG				117.17	
IR33	PA33SW14	ZINC	1809.660	MG/KG	>	150.00	>	109.86	*
IR33	PA33SW14	AROCLOR-1260	1400.000	UG/KG	>	22.70			
IR33	PA33SW14	TETRACHLOROETHENE	61.700	UG/KG					
IR33	PA33SW14	TOTAL OIL & GREASE	25000.000	MG/KG					
IR33	PA33SW14	TPH-DIESEL	1200.000	MG/KG					
IR33	PA33SW14	TPH-GASOLINE	9.400	MG/KG					
IR34	PA34SW07	ARSENIC	23.800	MG/KG	>	8.20			
IR34	PA34SW07	LEAD	741.000	MG/KG	>	46.70	>	8.99	*
IR34	PA34SW07	ALUMINUM	10000.000	MG/KG					
IR34	PA34SW07	ANTIMONY	33.200	MG/KG			>	9.05	
IR34	PA34SW07	BARIUM	361.000	MG/KG			>	314.36	
IR34	PA34SW07	CADMIUM	9.600	MG/KG	>	1.20	>	3.14	*
IR34	PA34SW07	CALCIUM	13500.000	MG/KG					
IR34	PA34SW07	CHROMIUM	479.000	MG/KG	>	81.00			
IR34	PA34SW07	COBALT	34.800	MG/KG					
IR34	PA34SW07	COPPER	2190.000	MG/KG	>	34.00	>	124.31	*
IR34	PA34SW07	IRON	48000.000	MG/KG					
IR34	PA34SW07	MAGNESIUM	7010.000	MG/KG					

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL D
STATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR34	PA34SW07	MANGANESE	601.000	MG/KG					
IR34	PA34SW07	MOLYBDENUM	233.000	MG/KG			>	2.68	
IR34	PA34SW07	NICKEL	335.000	MG/KG	>	20.90			
IR34	PA34SW07	MERCURY	864.000	MG/KG	>	0.15	>	2.28	*
IR34	PA34SW07	SILVER	2.000	MG/KG	>	1.00	>	1.43	*
IR34	PA34SW07	SODIUM	1730.000	MG/KG					
IR34	PA34SW07	VANADIUM	44.100	MG/KG				117.17	
IR34	PA34SW07	ZINC	1650.000	MG/KG	>	150.00	>	109.86	*
IR34	PA34SW07	4,4'-DDD	350.000	UG/KG					
IR34	PA34SW07	4,4'-DDE	610.000	UG/KG	>	2.20			
IR34	PA34SW07	AROCLOR-1254	4900.000	UG/KG	>	22.70			
IR34	PA34SW07	DIELDRIN	140.000	UG/KG					
IR34	PA34SW07	ENDOSULFAN II	72.000	UG/KG					
IR34	PA34SW07	GAMMA-CHLORDANE	31.000	UG/KG					
IR34	PA34SW07	4-METHYLPHENOL	2400.000	UG/KG					
IR34	PA34SW07	BENZO(A)ANTHRACENE	4300.000	UG/KG	>	261.00			
IR34	PA34SW07	BENZO(B)FLUORANTHENE	3200.000	UG/KG					
IR34	PA34SW07	BENZO(K)FLUORANTHENE	2800.000	UG/KG					
IR34	PA34SW07	CARBAZOLE	1600.000	UG/KG					
IR34	PA34SW07	CHRYSENE	6200.000	UG/KG	>	384.00			
IR34	PA34SW07	DIBENZOFURAN	760.000	UG/KG					
IR34	PA34SW07	FLUORANTHENE	18000.000	UG/KG	>	600.00			
IR34	PA34SW07	FLUORENE	2100.000	UG/KG	>	19.00			
IR34	PA34SW07	INDENO(1,2,3-CD)PYRENE	2100.000	UG/KG					
IR34	PA34SW07	NAPHTHALENE	1300.000	UG/KG	>	160.00			
IR34	PA34SW07	PENTACHLOROPHENOL	5000.000	UG/KG					
IR34	PA34SW07	PHENANTHRENE	12000.000	UG/KG	>	240.00			
IR34	PA34SW07	PYRENE	10000.000	UG/KG	>	668.00			
IR34	PA34SW07	1,1,1-TRICHLOROETHANE	7400.000	UG/KG					
IR34	PA34SW07	1,1,2-TRICHLOROETHANE	110.000	UG/KG					
IR34	PA34SW07	1,1-DICHLOROETHANE	3000.000	UG/KG					
IR34	PA34SW07	1,1-DICHLOROETHENE	2300.000	UG/KG					
IR34	PA34SW07	1,2-DICHLOROETHANE	140.000	UG/KG					
IR34	PA34SW07	1,2-DICHLOROETHENE (TOTAL)	13000.000	UG/KG					
IR34	PA34SW07	BENZENE	44.000	UG/KG					
IR34	PA34SW07	CARBON DISULFIDE	86.000	UG/KG					
IR34	PA34SW07	CHLOROBENZENE	87.000	UG/KG					
IR34	PA34SW07	CHLOROETHANE	34.000	UG/KG					
IR34	PA34SW07	CHLOROFORM	180.000	UG/KG					
IR34	PA34SW07	ETHYLBENZENE	2400.000	UG/KG					
IR34	PA34SW07	TETRACHLOROETHENE	110.000	UG/KG					
IR34	PA34SW07	TRICHLOROETHENE	17000.000	UG/KG					
IR34	PA34SW07	VINYL CHLORIDE	42.000	UG/KG					
IR34	PA34SW07	XYLENE (TOTAL)	5000.000	UG/KG					
IR34	PA34SW07	TOTAL OIL & GREASE	27000.000	MG/KG					
IR34	PA34SW07	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	15000000.000	UG/KG					
IR34	PA34SW07	ETHYLBENZENE	1400.000	UG/KG					
IR34	PA34SW07	TOLUENE	21000.000	UG/KG					
IR34	PA34SW07	TPH-GASOLINE	94000.000	UG/KG					
IR34	PA34SW07	XYLENE (TOTAL)	4900.000	UG/KG					
IR34	PA34SW10	MERCURY	0.180	MG/KG	>	0.15		2.28	
IR34	PA34SW10	ARSENIC	10.400	MG/KG	>	8.20			
IR34	PA34SW10	LEAD	1840.000	MG/KG	>	46.70	>	8.99	*
IR34	PA34SW10	ALUMINUM	9120.000	MG/KG					
IR34	PA34SW10	ANTIMONY	18.400	MG/KG			>	9.05	
IR34	PA34SW10	BARIUM	148.000	MG/KG				314.36	
IR34	PA34SW10	CALCIUM	11600.000	MG/KG					
IR34	PA34SW10	CHROMIUM	87.700	MG/KG	>	81.00			
IR34	PA34SW10	COBALT	12.900	MG/KG					
IR34	PA34SW10	COPPER	421.000	MG/KG	>	34.00	>	124.31	*
IR34	PA34SW10	IRON	26200.000	MG/KG					
IR34	PA34SW10	MAGNESIUM	6370.000	MG/KG					
IR34	PA34SW10	MANGANESE	547.000	MG/KG					
IR34	PA34SW10	MOLYBDENUM	106.000	MG/KG			>	2.68	
IR34	PA34SW10	NICKEL	72.300	MG/KG	>	20.90			
IR34	PA34SW10	POTASSIUM	702.000	MG/KG					

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

ICEL D
TION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR34	PA34SW10	SODIUM	583.000	MG/KG					
IR34	PA34SW10	VANADIUM	33.600	MG/KG				117.17	
IR34	PA34SW10	ZINC	484.000	MG/KG	>	150.00	>	109.86	*
IR34	PA34SW10	4,4'-DDD	9.100	UG/KG					
IR34	PA34SW10	4,4'-DDE	5.000	UG/KG	>	2.20			
IR34	PA34SW10	4,4'-DDT	5.800	UG/KG	>	1.58			
IR34	PA34SW10	ALPHA-CHLORDANE	8.500	UG/KG					
IR34	PA34SW10	AROCLOR-1254	480.000	UG/KG	>	22.70			
IR34	PA34SW10	DIELDRIN	17.000	UG/KG					
IR34	PA34SW10	ENDRIN	27.000	UG/KG					
IR34	PA34SW10	GAMMA-CHLORDANE	2.600	UG/KG					
IR34	PA34SW10	2-METHYLNAPHTHALENE	350.000	UG/KG	>	70.00			
IR34	PA34SW10	FLUORANTHENE	970.000	UG/KG	>	600.00			
IR34	PA34SW10	PHENANTHRENE	1800.000	UG/KG	>	240.00			
IR34	PA34SW10	PYRENE	810.000	UG/KG	>	668.00			
IR34	PA34SW10	BENZENE	4.000	UG/KG					
IR34	PA34SW10	CARBON DISULFIDE	6.000	UG/KG					
IR34	PA34SW10	ETHYLBENZENE	470.000	UG/KG					
IR34	PA34SW10	TOLUENE	8.000	UG/KG					
IR34	PA34SW10	XYLENE (TOTAL)	540.000	UG/KG					
IR34	PA34SW10	TOTAL OIL & GREASE	6600.000	MG/KG					
IR34	PA34SW10	TPH-DIESEL	440000.000	UG/KG					
IR34	PA34SW10	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	1200000.000	UG/KG					
IR34	PA34SW10	ETHYLBENZENE	1100.000	UG/KG					
IR34	PA34SW10	TOLUENE	11.000	UG/KG					
IR34	PA34SW10	TPH-PURGEABLE UNKNOWN HYDROCARBON	28000.000	UG/KG					
IR34	PA34SW10	XYLENE (TOTAL)	1500.000	UG/KG					
IR34	PA34SW12	MERCURY	0.280	MG/KG	>	0.15		2.28	
IR34	PA34SW12	ARSENIC	4.500	MG/KG		8.20			
IR34	PA34SW12	LEAD	65.300	MG/KG	>	46.70	>	8.99	*
IR34	PA34SW12	ALUMINUM	7030.000	MG/KG					
IR34	PA34SW12	BARIUM	111.000	MG/KG				314.36	
IR34	PA34SW12	CALCIUM	68200.000	MG/KG					
IR34	PA34SW12	CHROMIUM	77.600	MG/KG		81.00			
IR34	PA34SW12	COBALT	49.100	MG/KG					
IR34	PA34SW12	COPPER	193.000	MG/KG	>	34.00	>	124.31	*
IR34	PA34SW12	IRON	17100.000	MG/KG					
IR34	PA34SW12	MAGNESIUM	6450.000	MG/KG					
IR34	PA34SW12	MANGANESE	336.000	MG/KG					
IR34	PA34SW12	NICKEL	82.100	MG/KG	>	20.90			
IR34	PA34SW12	POTASSIUM	599.000	MG/KG					
IR34	PA34SW12	SILVER	0.980	MG/KG		1.00		1.43	
IR34	PA34SW12	VANADIUM	19.500	MG/KG				117.17	
IR34	PA34SW12	ZINC	1010.000	MG/KG	>	150.00	>	109.86	*
IR34	PA34SW12	4,4'-DDD	12.000	UG/KG					
IR34	PA34SW12	4,4'-DDE	14.000	UG/KG	>	2.20			
IR34	PA34SW12	ALPHA-CHLORDANE	12.000	UG/KG					
IR34	PA34SW12	AROCLOR-1254	480.000	UG/KG	>	22.70			
IR34	PA34SW12	DELTA-BHC	4.400	UG/KG					
IR34	PA34SW12	DIELDRIN	10.000	UG/KG					
IR34	PA34SW12	ENDOSULFAN II	20.000	UG/KG					
IR34	PA34SW12	GAMMA-CHLORDANE	5.500	UG/KG					
IR34	PA34SW12	2-METHYLNAPHTHALENE	46.000	UG/KG		70.00			
IR34	PA34SW12	2-METHYLPHENOL	440.000	UG/KG					
IR34	PA34SW12	FLUORANTHENE	690.000	UG/KG	>	600.00			
IR34	PA34SW12	PENTACHLOROPHENOL	620.000	UG/KG					
IR34	PA34SW12	PHENANTHRENE	440.000	UG/KG	>	240.00			
IR34	PA34SW12	PHENOL	640.000	UG/KG					
IR34	PA34SW12	PYRENE	570.000	UG/KG		668.00			
IR34	PA34SW12	CARBON DISULFIDE	1.000	UG/KG					
IR34	PA34SW12	CHLOROETHANE	5.000	UG/KG					
IR34	PA34SW12	ETHYLBENZENE	22.000	UG/KG					
IR34	PA34SW12	TOLUENE	2.000	UG/KG					
IR34	PA34SW12	XYLENE (TOTAL)	6.000	UG/KG					
IR34	PA34SW12	TOTAL OIL & GREASE	1100.000	MG/KG					
IR34	PA34SW12	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	260000.000	UG/KG					

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PARCEL D
STATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR34	PA34SW12	BENZOIC ACID	190.000	UG/KG					
IR34	PA34SW12	TOLUENE	12.000	UG/KG					
IR34	PA34SW12	TPH-GASOLINE	710.000	UG/KG					
IR34	PA34SW12	XYLENE (TOTAL)	59.000	UG/KG					
IR37	PA37SW01	MERCURY	0.230	MG/KG	>	0.15		2.28	
IR37	PA37SW01	ARSENIC	5.800	MG/KG		8.20			
IR37	PA37SW01	ALUMINUM	9120.000	MG/KG					
IR37	PA37SW01	BARIUM	275.000	MG/KG				314.36	
IR37	PA37SW01	CADMIUM	3.200	MG/KG	>	1.20	>	3.14	*
IR37	PA37SW01	CALCIUM	9340.000	MG/KG					
IR37	PA37SW01	CHROMIUM	188.000	MG/KG	>	81.00			
IR37	PA37SW01	COBALT	17.500	MG/KG					
IR37	PA37SW01	COPPER	342.000	MG/KG	>	34.00	>	124.31	*
IR37	PA37SW01	IRON	25700.000	MG/KG					
IR37	PA37SW01	MAGNESIUM	21700.000	MG/KG					
IR37	PA37SW01	MANGANESE	589.000	MG/KG					
IR37	PA37SW01	MOLYBDENUM	2.700	MG/KG			>	2.68	
IR37	PA37SW01	NICKEL	226.000	MG/KG	>	20.90			
IR37	PA37SW01	POTASSIUM	734.000	MG/KG					
IR37	PA37SW01	SODIUM	414.000	MG/KG					
IR37	PA37SW01	VANADIUM	40.700	MG/KG				117.17	
IR37	PA37SW01	ZINC	727.000	MG/KG	>	150.00	>	109.86	*
IR37	PA37SW01	4,4'-DDD	25.000	UG/KG					
IR37	PA37SW01	4,4'-DDE	28.000	UG/KG	>	2.20			
IR37	PA37SW01	AROCLOR-1260	3100.000	UG/KG	>	22.70			
IR37	PA37SW01	DIELDRIN	34.000	UG/KG					
IR37	PA37SW01	ENDOSULFAN II	110.000	UG/KG					
IR37	PA37SW01	ENDRIN ALDEHYDE	83.000	UG/KG					
IR37	PA37SW01	GAMMA-CHLORDANE	6.500	UG/KG					
IR37	PA37SW01	BENZO(A)ANTHRACENE	510.000	UG/KG	>	261.00			
IR37	PA37SW01	BIS(2-ETHYLHEXYL)PHTHALATE	4100.000	UG/KG					
IR37	PA37SW01	BUTYLBENZYLPHTHALATE	360.000	UG/KG					
IR37	PA37SW01	CHRYSENE	670.000	UG/KG	>	384.00			
IR37	PA37SW01	DI-N-BUTYLPHTHALATE	410.000	UG/KG					
IR37	PA37SW01	FLUORANTHENE	1000.000	UG/KG	>	600.00			
IR37	PA37SW01	PHENANTHRENE	700.000	UG/KG	>	240.00			
IR37	PA37SW01	PYRENE	1100.000	UG/KG	>	668.00			
IR37	PA37SW01	TOTAL OIL & GREASE	1600.000	MG/KG					
IR37	PA37SW01	TPH-MOTOR OIL	330000.000	UG/KG					
IR37	PA37SW01	ETHYLBENZENE	3.000	UG/KG					
IR37	PA37SW01	TPH-PURGEABLE UNKNOWN HYDROCARBON	1300.000	UG/KG					
IR37	PA37SW01	XYLENE (TOTAL)	21.000	UG/KG					
IR37	PA37SW05	MERCURY	4.600	MG/KG	>	0.15	>	2.28	*
IR37	PA37SW05	ARSENIC	9.300	MG/KG	>	8.20			
IR37	PA37SW05	LEAD	4120.000	MG/KG	>	46.70	>	8.99	*
IR37	PA37SW05	SELENIUM	30.300	MG/KG			>	1.95	
IR37	PA37SW05	ALUMINUM	5630.000	MG/KG					
IR37	PA37SW05	BARIUM	609.000	MG/KG			>	314.36	
IR37	PA37SW05	CADMIUM	27.300	MG/KG	>	1.20	>	3.14	*
IR37	PA37SW05	CALCIUM	6160.000	MG/KG					
IR37	PA37SW05	CHROMIUM	426.000	MG/KG	>	81.00			
IR37	PA37SW05	COBALT	14.200	MG/KG					
IR37	PA37SW05	COPPER	1430.000	MG/KG	>	34.00	>	124.31	*
IR37	PA37SW05	IRON	42300.000	MG/KG					
IR37	PA37SW05	MAGNESIUM	5850.000	MG/KG					
IR37	PA37SW05	MANGANESE	446.000	MG/KG					
IR37	PA37SW05	MOLYBDENUM	16.700	MG/KG			>	2.68	
IR37	PA37SW05	NICKEL	239.000	MG/KG	>	20.90			
IR37	PA37SW05	POTASSIUM	405.000	MG/KG					
IR37	PA37SW05	SILVER	4.900	MG/KG	>	1.00	>	1.43	*
IR37	PA37SW05	SODIUM	468.000	MG/KG					
IR37	PA37SW05	VANADIUM	30.800	MG/KG				117.17	
IR37	PA37SW05	ZINC	5960.000	MG/KG	>	150.00	>	109.86	*
IR37	PA37SW05	AROCLOR-1260	3900000.000	UG/KG	>	22.70			
IR37	PA37SW05	DIELDRIN	20000.000	UG/KG					
IR37	PA37SW05	ENDOSULFAN II	140000.000	UG/KG					

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PARCEL D
STATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR37	PA37SW05	ENDRIN ALDEHYDE	81000.000	UG/KG					
IR37	PA37SW05	ENDRIN KETONE	4800.000	UG/KG					
IR37	PA37SW05	GAMMA-CHLORDANE	2500.000	UG/KG					
IR37	PA37SW05	1,2,4-TRICHLOROBENZENE	12000.000	UG/KG					
IR37	PA37SW05	1,2-DICHLOROBENZENE	95000.000	UG/KG					
IR37	PA37SW05	1,3-DICHLOROBENZENE	320000.000	UG/KG					
IR37	PA37SW05	1,4-DICHLOROBENZENE	1400000.000	UG/KG					
IR37	PA37SW05	2-METHYLNAPHTHALENE	27000.000	UG/KG	>	70.00			
IR37	PA37SW05	BIS(2-ETHYLHEXYL)PHTHALATE	240000.000	UG/KG					
IR37	PA37SW05	BUTYLBENZYLPHTHALATE	330000.000	UG/KG					
IR37	PA37SW05	DI-N-BUTYLPHTHALATE	48000.000	UG/KG					
IR37	PA37SW05	DI-N-OCTYLPHTHALATE	45000.000	UG/KG					
IR37	PA37SW05	FLUORANTHENE	4600.000	UG/KG	>	600.00			
IR37	PA37SW05	NAPHTHALENE	28000.000	UG/KG	>	160.00			
IR37	PA37SW05	PHENANTHRENE	6600.000	UG/KG	>	240.00			
IR37	PA37SW05	PYRENE	24000.000	UG/KG	>	668.00			
IR37	PA37SW05	ACETONE	360000.000	UG/KG					
IR37	PA37SW05	CHLOROBENZENE	5300000.000	UG/KG					
IR37	PA37SW05	ETHYLBENZENE	130000.000	UG/KG					
IR37	PA37SW05	METHYLENE CHLORIDE	34000.000	UG/KG					
IR37	PA37SW05	TOLUENE	68000.000	UG/KG					
IR37	PA37SW05	XYLENE (TOTAL)	110000.000	UG/KG					
IR37	PA37SW05	TOTAL OIL & GREASE	39000.000	MG/KG					
IR37	PA37SW05	TPH-KEROSENE	2200000.000	UG/KG					
IR37	PA37SW05	TPH-MOTOR OIL	38000000.000	UG/KG					
IR37	PA37SW05	BENZENE	2200.000	UG/KG					
IR37	PA37SW05	TOLUENE	3200.000	UG/KG					
IR37	PA37SW05	TPH-GASOLINE	110000.000	UG/KG					
IR37	PA37SW05	TPH-PURGEABLE UNKNOWN HYDROCARBON	320000.000	UG/KG					
IR37	PA37SW05	XYLENE (TOTAL)	5100.000	UG/KG					
PA44	PA44SW02	MERCURY	0.130	MG/KG		0.15		2.28	
PA44	PA44SW02	ARSENIC	6.800	MG/KG		8.20			
PA44	PA44SW02	ALUMINUM	5060.000	MG/KG					
PA44	PA44SW02	BARIUM	146.000	MG/KG				314.36	
PA44	PA44SW02	CADMIUM	2.300	MG/KG	>	1.20		3.14	
PA44	PA44SW02	CALCIUM	4460.000	MG/KG					
PA44	PA44SW02	CHROMIUM	278.000	MG/KG	>	81.00			
PA44	PA44SW02	COBALT	12.700	MG/KG					
PA44	PA44SW02	COPPER	668.000	MG/KG	>	34.00	>	124.31	*
PA44	PA44SW02	IRON	54800.000	MG/KG					
PA44	PA44SW02	LEAD	642.000	MG/KG	>	46.70	>	8.99	*
PA44	PA44SW02	MAGNESIUM	9420.000	MG/KG					
PA44	PA44SW02	MANGANESE	427.000	MG/KG					
PA44	PA44SW02	MOLYBDENUM	55.300	MG/KG			>	2.68	
PA44	PA44SW02	NICKEL	174.000	MG/KG	>	20.90			
PA44	PA44SW02	SODIUM	487.000	MG/KG					
PA44	PA44SW02	VANADIUM	18.900	MG/KG				117.17	
PA44	PA44SW02	ZINC	1560.000	MG/KG	>	150.00	>	109.86	*
PA44	PA44SW02	AROCLOR-1242	160.000	UG/KG	>	22.70			
PA44	PA44SW02	AROCLOR-1254	45.000	UG/KG	>	22.70			
PA44	PA44SW02	AROCLOR-1260	93.000	UG/KG	>	22.70			
PA44	PA44SW02	PH	7.200	PH		><		><	
PA44	PA44SW02	TOTAL OIL & GREASE	9000.000	MG/KG					
PA44	PA44SW02	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	1600.000	MG/KG					
PA44	PA44SW02	TPH-PURGEABLE UNKNOWN HYDROCARBON	4.000	MG/KG					
PA44	PA44SW03	MERCURY	0.080	MG/KG		0.15		2.28	
PA44	PA44SW03	ARSENIC	26.500	MG/KG	>	8.20			
PA44	PA44SW03	ALUMINUM	3180.000	MG/KG					
PA44	PA44SW03	BARIUM	194.000	MG/KG				314.36	
PA44	PA44SW03	CADMIUM	1.500	MG/KG	>	1.20		3.14	
PA44	PA44SW03	CALCIUM	56700.000	MG/KG					
PA44	PA44SW03	CHROMIUM	144.000	MG/KG	>	81.00			
PA44	PA44SW03	COBALT	13.800	MG/KG					
PA44	PA44SW03	COPPER	585.000	MG/KG	>	34.00	>	124.31	*
PA44	PA44SW03	IRON	41800.000	MG/KG					
PA44	PA44SW03	LEAD	726.000	MG/KG	>	46.70	>	8.99	*

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PARCEL D
STATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
PA44	PA44SW03	MAGNESIUM	7650.000	MG/KG					
PA44	PA44SW03	MANGANESE	394.000	MG/KG					
PA44	PA44SW03	MOLYBDENUM	125.000	MG/KG			>	2.68	
PA44	PA44SW03	NICKEL	61.700	MG/KG	>	20.90			
PA44	PA44SW03	SODIUM	251.000	MG/KG					
PA44	PA44SW03	VANADIUM	13.900	MG/KG				117.17	
PA44	PA44SW03	ZINC	1330.000	MG/KG	>	150.00	>	109.86	*
PA44	PA44SW03	AROCLOR-1254	84.000	UG/KG	>	22.70			
PA44	PA44SW03	AROCLOR-1260	210.000	UG/KG	>	22.70			
PA44	PA44SW03	ACENAPHTHENE	120.000	UG/KG	>	16.00			
PA44	PA44SW03	ANTHRACENE	180.000	UG/KG	>	85.30			
PA44	PA44SW03	BENZO(A)ANTHRACENE	680.000	UG/KG	>	261.00			
PA44	PA44SW03	BENZO(A)PYRENE	520.000	UG/KG	>	430.00			
PA44	PA44SW03	BENZO(B)FLUORANTHENE	1100.000	UG/KG					
PA44	PA44SW03	BENZO(G,H,I)PERYLENE	490.000	UG/KG					
PA44	PA44SW03	BENZO(K)FLUORANTHENE	310.000	UG/KG					
PA44	PA44SW03	CARBAZOLE	210.000	UG/KG					
PA44	PA44SW03	CHRYSENE	660.000	UG/KG	>	384.00			
PA44	PA44SW03	FLUORANTHENE	1500.000	UG/KG	>	600.00			
PA44	PA44SW03	FLUORENE	100.000	UG/KG	>	19.00			
PA44	PA44SW03	PHENANTHRENE	840.000	UG/KG	>	240.00			
PA44	PA44SW03	PYRENE	1100.000	UG/KG	>	668.00			
PA44	PA44SW03	PH	8.300	PH		><		><	
PA44	PA44SW03	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	56.000	MG/KG					
IR50	PA50CB400	MERCURY	22.000	MG/KG	>	0.15	>	2.28	*
IR50	PA50CB400	ARSENIC	38.200	MG/KG	>	8.20			
IR50	PA50CB400	ALUMINUM	15500.000	MG/KG					
IR50	PA50CB400	ANTIMONY	119.000	MG/KG			>	9.05	
IR50	PA50CB400	BARIUM	329.000	MG/KG			>	314.36	
IR50	PA50CB400	BERYLLIUM	0.360	MG/KG				0.71	
IR50	PA50CB400	CALCIUM	30100.000	MG/KG					
IR50	PA50CB400	CHROMIUM	281.000	MG/KG	>	81.00			
IR50	PA50CB400	COPPER	1710.000	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB400	IRON	63400.000	MG/KG					
IR50	PA50CB400	LEAD	764.000	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB400	MAGNESIUM	12900.000	MG/KG					
IR50	PA50CB400	MANGANESE	808.000	MG/KG					
IR50	PA50CB400	MOLYBDENUM	170.000	MG/KG			>	2.68	
IR50	PA50CB400	NICKEL	531.000	MG/KG	>	20.90			
IR50	PA50CB400	POTASSIUM	1910.000	MG/KG					
IR50	PA50CB400	SILVER	1.600	MG/KG	>	1.00	>	1.43	*
IR50	PA50CB400	SODIUM	3750.000	MG/KG					
IR50	PA50CB400	VANADIUM	573.000	MG/KG			>	117.17	
IR50	PA50CB400	ZINC	1860.000	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB400	AROCLOR-1242	64.000	UG/KG	>	22.70			
IR50	PA50CB400	AROCLOR-1254	140.000	UG/KG	>	22.70			
IR50	PA50CB400	AROCLOR-1260	130.000	UG/KG	>	22.70			
IR50	PA50CB400	ANTHRACENE	400.000	UG/KG	>	85.30			
IR50	PA50CB400	BENZO(A)ANTHRACENE	4600.000	UG/KG	>	261.00			
IR50	PA50CB400	BENZO(A)PYRENE	3200.000	UG/KG	>	430.00			
IR50	PA50CB400	BENZO(B)FLUORANTHENE	5700.000	UG/KG					
IR50	PA50CB400	BENZO(G,H,I)PERYLENE	1100.000	UG/KG					
IR50	PA50CB400	BENZO(K)FLUORANTHENE	1200.000	UG/KG					
IR50	PA50CB400	BIS(2-ETHYLHEXYL)PHTHALATE	35000.000	UG/KG					
IR50	PA50CB400	BUTYLBENZYLPHTHALATE	26000.000	UG/KG					
IR50	PA50CB400	CHRYSENE	2900.000	UG/KG	>	384.00			
IR50	PA50CB400	DI-N-BUTYLPHTHALATE	900.000	UG/KG					
IR50	PA50CB400	FLUORANTHENE	4700.000	UG/KG	>	600.00			
IR50	PA50CB400	INDENO(1,2,3-CD)PYRENE	1600.000	UG/KG					
IR50	PA50CB400	PHENANTHRENE	700.000	UG/KG	>	240.00			
IR50	PA50CB400	PYRENE	5300.000	UG/KG	>	668.00			
IR50	PA50CB400	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	3800.000	MG/KG					
IR50	PA50CB400	PH	7.600	PH		><		><	
IR50	PA50CB400	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	1000.000	MG/KG					
IR50	PA50CB401	MERCURY	0.300	MG/KG	>	0.15		2.28	
IR50	PA50CB401	ARSENIC	6.100	MG/KG		8.20			

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

RCEL D
ATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50CB401	ALUMINUM	15000.000	MG/KG					
IR50	PA50CB401	BARIUM	837.000	MG/KG			>	314.36	
IR50	PA50CB401	CALCIUM	20300.000	MG/KG					
IR50	PA50CB401	CHROMIUM	125.000	MG/KG	>	81.00			
IR50	PA50CB401	COPPER	512.000	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB401	IRON	40800.000	MG/KG					
IR50	PA50CB401	LEAD	518.000	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB401	MAGNESIUM	12700.000	MG/KG					
IR50	PA50CB401	MANGANESE	650.000	MG/KG					
IR50	PA50CB401	MOLYBDENUM	13.700	MG/KG			>	2.68	
IR50	PA50CB401	NICKEL	121.000	MG/KG	>	20.90			
IR50	PA50CB401	POTASSIUM	1240.000	MG/KG					
IR50	PA50CB401	SILVER	0.810	MG/KG		1.00		1.43	
IR50	PA50CB401	SODIUM	1000.000	MG/KG					
IR50	PA50CB401	VANADIUM	63.500	MG/KG				117.17	
IR50	PA50CB401	ZINC	611.000	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB401	AROCLOR-1242	39.000	UG/KG	>	22.70			
IR50	PA50CB401	AROCLOR-1254	47.000	UG/KG	>	22.70			
IR50	PA50CB401	AROCLOR-1260	78.000	UG/KG	>	22.70			
IR50	PA50CB401	ANTHRACENE	170.000	UG/KG	>	85.30			
IR50	PA50CB401	BENZO(A)ANTHRACENE	850.000	UG/KG	>	261.00			
IR50	PA50CB401	BENZO(A)PYRENE	390.000	UG/KG		430.00			
IR50	PA50CB401	BENZO(B)FLUORANTHENE	970.000	UG/KG					
IR50	PA50CB401	BENZO(G,H,I)PERYLENE	190.000	UG/KG					
IR50	PA50CB401	BIS(2-ETHYLHEXYL)PHTHALATE	14000.000	UG/KG					
IR50	PA50CB401	BUTYLBENZYLPHTHALATE	260.000	UG/KG					
IR50	PA50CB401	CHRYSENE	650.000	UG/KG	>	384.00			
IR50	PA50CB401	FLUORANTHENE	1800.000	UG/KG	>	600.00			
IR50	PA50CB401	INDENO(1,2,3-CD)PYRENE	240.000	UG/KG					
IR50	PA50CB401	PHENANTHRENE	740.000	UG/KG	>	240.00			
IR50	PA50CB401	PYRENE	1500.000	UG/KG	>	668.00			
IR50	PA50CB401	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	1600.000	MG/KG					
IR50	PA50CB401	PH	8.500	PH		><		><	
IR50	PA50CB401	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	1800.000	MG/KG					
IR50	PA50CB402	LEAD	45.300	MG/KG		46.70	>	8.99	
IR50	PA50CB402	ALUMINUM	573.000	MG/KG					
IR50	PA50CB402	BARIUM	257.000	MG/KG				314.36	
IR50	PA50CB402	CALCIUM	1300.000	MG/KG					
IR50	PA50CB402	CHROMIUM	7.400	MG/KG		81.00			
IR50	PA50CB402	COPPER	44.600	MG/KG	>	34.00		124.31	
IR50	PA50CB402	IRON	1620.000	MG/KG					
IR50	PA50CB402	MAGNESIUM	469.000	MG/KG					
IR50	PA50CB402	MANGANESE	28.500	MG/KG					
IR50	PA50CB402	MOLYBDENUM	1.000	MG/KG				2.68	
IR50	PA50CB402	SODIUM	452.000	MG/KG					
IR50	PA50CB402	VANADIUM	3.500	MG/KG				117.17	
IR50	PA50CB402	ZINC	211.000	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB402	DI-N-BUTYLPHTHALATE	180.000	UG/KG					
IR50	PA50CB402	FLUORENE	21000.000	UG/KG	>	19.00			
IR50	PA50CB402	PHENANTHRENE	48000.000	UG/KG	>	240.00			
IR50	PA50CB402	TOTAL OIL & GREASE	63000.000	MG/KG					
IR50	PA50CB402	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	110000.000	MG/L					
IR50	PA50CB402	TPH-PURGEABLE UNKNOWN HYDROCARBON	3200.000	MG/KG					
IR50	PA50CB403	% SOLIDS	82.700	%					
IR50	PA50CB403	CYANIDE	0.260	MG/KG					
IR50	PA50CB403	MERCURY	0.750	MG/KG	>	0.15		2.28	
IR50	PA50CB403	ARSENIC	3.910	MG/KG		8.20			
IR50	PA50CB403	ALUMINUM	11495.800	MG/KG					
IR50	PA50CB403	ANTIMONY	6.490	MG/KG				9.05	
IR50	PA50CB403	BARIUM	99.830	MG/KG				314.36	
IR50	PA50CB403	BERYLLIUM	0.270	MG/KG				0.71	
IR50	PA50CB403	CADMIUM	1.470	MG/KG	>	1.20		3.14	
IR50	PA50CB403	CALCIUM	7292.970	MG/KG					
IR50	PA50CB403	CHROMIUM	127.420	MG/KG	>	81.00			
IR50	PA50CB403	COBALT	14.880	MG/KG					
IR50	PA50CB403	COPPER	402.350	MG/KG	>	34.00	>	124.31	*

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL D
STATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50CB403	IRON	23254.700	MG/KG					
IR50	PA50CB403	LEAD	687.650	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB403	MAGNESIUM	11381.800	MG/KG					
IR50	PA50CB403	MANGANESE	303.630	MG/KG					
IR50	PA50CB403	MOLYBDENUM	7.680	MG/KG			>	2.68	
IR50	PA50CB403	NICKEL	128.070	MG/KG	>	20.90			
IR50	PA50CB403	POTASSIUM	943.660	MG/KG					
IR50	PA50CB403	SODIUM	1565.590	MG/KG					
IR50	PA50CB403	VANADIUM	49.490	MG/KG				117.17	
IR50	PA50CB403	ZINC	711.950	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB403	4,4'-DDD	1200.000	UG/KG					
IR50	PA50CB403	AROCLOR-1260	2300.000	UG/KG	>	22.70			
IR50	PA50CB403	CARBON DISULFIDE	5.370	UG/KG					
IR50	PA50CB403	VINYL CHLORIDE	66.720	UG/KG					
IR50	PA50CB403	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	940.000	MG/KG					
IR50	PA50CB403	PH	8.200	PH		><		><	
IR50	PA50CB403	TPH-DIESEL	320.000	MG/KG					
IR50	PA50CB404	% SOLIDS	75.200	%					
IR50	PA50CB404	CYANIDE	0.220	MG/KG					
IR50	PA50CB404	MERCURY	0.130	MG/KG		0.15		2.28	
IR50	PA50CB404	ARSENIC	3.170	MG/KG		8.20			
IR50	PA50CB404	ALUMINUM	10744.300	MG/KG					
IR50	PA50CB404	BARIUM	122.390	MG/KG				314.36	
IR50	PA50CB404	BERYLLIUM	0.240	MG/KG				0.71	
IR50	PA50CB404	CADMIUM	2.000	MG/KG	>	1.20		3.14	
IR50	PA50CB404	CALCIUM	8392.990	MG/KG					
IR50	PA50CB404	CHROMIUM	209.510	MG/KG	>	81.00			
IR50	PA50CB404	COBALT	28.750	MG/KG					
IR50	PA50CB404	COPPER	122.630	MG/KG	>	34.00		124.31	
IR50	PA50CB404	IRON	29964.000	MG/KG					
IR50	PA50CB404	LEAD	226.850	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB404	MAGNESIUM	51967.200	MG/KG					
IR50	PA50CB404	MANGANESE	512.100	MG/KG					
IR50	PA50CB404	MOLYBDENUM	4.120	MG/KG			>	2.68	
IR50	PA50CB404	NICKEL	538.880	MG/KG	>	20.90			
IR50	PA50CB404	POTASSIUM	542.780	MG/KG					
IR50	PA50CB404	SODIUM	179.230	MG/KG					
IR50	PA50CB404	VANADIUM	39.200	MG/KG				117.17	
IR50	PA50CB404	ZINC	328.850	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB404	AROCLOR-1260	890.000	UG/KG	>	22.70			
IR50	PA50CB404	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	420.000	MG/KG					
IR50	PA50CB404	PH	7.400	PH		><		><	
IR50	PA50CB404	TPH-DIESEL	290.000	MG/KG					
IR50	PA50CB405	% SOLIDS	78.800	%					
IR50	PA50CB405	CYANIDE	0.330	MG/KG					
IR50	PA50CB405	MERCURY	0.310	MG/KG	>	0.15		2.28	
IR50	PA50CB405	ARSENIC	3.630	MG/KG		8.20			
IR50	PA50CB405	ALUMINUM	8654.610	MG/KG					
IR50	PA50CB405	ANTIMONY	5.130	MG/KG				9.05	
IR50	PA50CB405	BARIUM	339.710	MG/KG			>	314.36	
IR50	PA50CB405	BERYLLIUM	0.160	MG/KG				0.71	
IR50	PA50CB405	CADMIUM	0.700	MG/KG		1.20		3.14	
IR50	PA50CB405	CALCIUM	10157.800	MG/KG					
IR50	PA50CB405	CHROMIUM	150.380	MG/KG	>	81.00			
IR50	PA50CB405	COBALT	16.200	MG/KG					
IR50	PA50CB405	COPPER	179.410	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB405	IRON	23815.200	MG/KG					
IR50	PA50CB405	LEAD	304.360	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB405	MAGNESIUM	24144.900	MG/KG					
IR50	PA50CB405	MANGANESE	366.970	MG/KG					
IR50	PA50CB405	MOLYBDENUM	1.610	MG/KG				2.68	
IR50	PA50CB405	NICKEL	273.640	MG/KG	>	20.90			
IR50	PA50CB405	POTASSIUM	342.890	MG/KG					
IR50	PA50CB405	SODIUM	549.740	MG/KG					
IR50	PA50CB405	VANADIUM	35.620	MG/KG				117.17	
IR50	PA50CB405	ZINC	354.800	MG/KG	>	150.00	>	109.86	*

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

.CEL D
.ATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50CB405	AROCLOR-1260	3700.000	UG/KG	>	22.70			
IR50	PA50CB405	CARBON DISULFIDE	8.130	UG/KG					
IR50	PA50CB405	ETHYLBENZENE	4.310	UG/KG					
IR50	PA50CB405	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	1300.000	MG/KG					
IR50	PA50CB405	PH	7.500	PH		><		><	
IR50	PA50CB405	TPH-DIESEL	340.000	MG/KG					
IR50	PA50CB406	% SOLIDS	82.100	%					
IR50	PA50CB406	CYANIDE	0.460	MG/KG					
IR50	PA50CB406	MERCURY	0.240	MG/KG	>	0.15		2.28	
IR50	PA50CB406	ARSENIC	5.230	MG/KG		8.20			
IR50	PA50CB406	ALUMINUM	10092.600	MG/KG					
IR50	PA50CB406	ANTIMONY	7.070	MG/KG				9.05	
IR50	PA50CB406	BARIUM	217.820	MG/KG				314.36	
IR50	PA50CB406	BERYLLIUM	0.180	MG/KG				0.71	
IR50	PA50CB406	CADMIUM	2.080	MG/KG	>	1.20		3.14	
IR50	PA50CB406	CALCIUM	14591.700	MG/KG					
IR50	PA50CB406	CHROMIUM	90.590	MG/KG	>	81.00			
IR50	PA50CB406	COBALT	12.400	MG/KG					
IR50	PA50CB406	COPPER	263.210	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB406	IRON	29219.300	MG/KG					
IR50	PA50CB406	LEAD	497.550	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB406	MAGNESIUM	8712.000	MG/KG					
IR50	PA50CB406	MANGANESE	362.870	MG/KG					
IR50	PA50CB406	MOLYBDENUM	23.220	MG/KG			>	2.68	
IR50	PA50CB406	NICKEL	90.150	MG/KG	>	20.90			
IR50	PA50CB406	POTASSIUM	525.610	MG/KG					
IR50	PA50CB406	SODIUM	476.420	MG/KG					
IR50	PA50CB406	VANADIUM	44.940	MG/KG				117.17	
IR50	PA50CB406	ZINC	773.180	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB406	AROCLOR-1260	970.000	UG/KG	>	22.70			
IR50	PA50CB406	ETHYLBENZENE	34.430	UG/KG					
IR50	PA50CB406	XYLENE (TOTAL)	64.390	UG/KG					
IR50	PA50CB406	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	5900.000	MG/KG					
IR50	PA50CB406	PH	9.400	PH		><		><	
IR50	PA50CB406	TPH-DIESEL	1000.000	MG/KG					
IR50	PA50CB406	TPH-GASOLINE	53.000	MG/KG					
IR50	PA50CB408	% SOLIDS	49.600	%					
IR50	PA50CB408	MERCURY	1.980	MG/KG	>	0.15		2.28	
IR50	PA50CB408	ARSENIC	12.570	MG/KG	>	8.20			
IR50	PA50CB408	ALUMINUM	25969.500	MG/KG					
IR50	PA50CB408	BARIUM	148.250	MG/KG				314.36	
IR50	PA50CB408	CADMIUM	12.430	MG/KG	>	1.20	>	3.14	*
IR50	PA50CB408	CALCIUM	6660.870	MG/KG					
IR50	PA50CB408	CHROMIUM	241.330	MG/KG	>	81.00			
IR50	PA50CB408	COBALT	42.920	MG/KG					
IR50	PA50CB408	COPPER	2496.240	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB408	IRON	86133.300	MG/KG					
IR50	PA50CB408	LEAD	6853.280	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB408	MAGNESIUM	15222.300	MG/KG					
IR50	PA50CB408	MANGANESE	783.890	MG/KG					
IR50	PA50CB408	MOLYBDENUM	67.010	MG/KG			>	2.68	
IR50	PA50CB408	NICKEL	5446.810	MG/KG	>	20.90			
IR50	PA50CB408	POTASSIUM	3750.160	MG/KG					
IR50	PA50CB408	SODIUM	3863.600	MG/KG					
IR50	PA50CB408	VANADIUM	88.920	MG/KG				117.17	
IR50	PA50CB408	ZINC	1262.290	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB408	AROCLOR-1260	380.000	UG/KG	>	22.70			
IR50	PA50CB408	FLUORANTHENE	974.930	UG/KG	>	600.00			
IR50	PA50CB408	PHENANTHRENE	459.400	UG/KG	>	240.00			
IR50	PA50CB408	PYRENE	809.900	UG/KG	>	668.00			
IR50	PA50CB408	CARBON DISULFIDE	52.470	UG/KG					
IR50	PA50CB408	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	52.000	MG/KG					
IR50	PA50CB408	PH	7.400	PH		><		><	
IR50	PA50CB408	TPH-DIESEL	140.000	MG/KG					
IR50	PA50CB409	% SOLIDS	87.700	%					
IR50	PA50CB409	MERCURY	0.120	MG/KG		0.15		2.28	

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL D
STATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50CB409	ARSENIC	4.960	MG/KG		8.20			
IR50	PA50CB409	LEAD	73.060	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB409	SELENIUM	0.470	MG/KG				1.95	
IR50	PA50CB409	ALUMINUM	7001.090	MG/KG					
IR50	PA50CB409	BARIUM	44.920	MG/KG				314.36	
IR50	PA50CB409	CALCIUM	6889.850	MG/KG					
IR50	PA50CB409	CHROMIUM	39.820	MG/KG		81.00			
IR50	PA50CB409	COBALT	10.820	MG/KG					
IR50	PA50CB409	COPPER	45.040	MG/KG	>	34.00		124.31	
IR50	PA50CB409	IRON	18697.100	MG/KG					
IR50	PA50CB409	MAGNESIUM	5720.830	MG/KG					
IR50	PA50CB409	MANGANESE	391.050	MG/KG					
IR50	PA50CB409	NICKEL	45.160	MG/KG	>	20.90			
IR50	PA50CB409	SODIUM	399.800	MG/KG					
IR50	PA50CB409	VANADIUM	37.070	MG/KG				117.17	
IR50	PA50CB409	ZINC	115.800	MG/KG		150.00	>	109.86	
IR50	PA50CB409	AROCLOR-1260	71.000	UG/KG	>	22.70			
IR50	PA50CB409	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	150.000	MG/KG					
IR50	PA50CB409	PH	9.300	PH		><		><	
IR50	PA50CB409	TPH-DIESEL	240.000	MG/KG					
IR50	PA50CB410	% SOLIDS	72.600	%					
IR50	PA50CB410	MERCURY	0.190	MG/KG	>	0.15		2.28	
IR50	PA50CB410	ARSENIC	5.770	MG/KG		8.20			
IR50	PA50CB410	ALUMINUM	3964.420	MG/KG					
IR50	PA50CB410	ANTIMONY	40.860	MG/KG			>	9.05	
IR50	PA50CB410	BARIUM	150.590	MG/KG				314.36	
IR50	PA50CB410	BERYLLIUM	0.860	MG/KG			>	0.71	
IR50	PA50CB410	CADMIUM	7.720	MG/KG	>	1.20	>	3.14	*
IR50	PA50CB410	CALCIUM	262368.000	MG/KG					
IR50	PA50CB410	CHROMIUM	52.710	MG/KG		81.00			
IR50	PA50CB410	COBALT	8.450	MG/KG					
IR50	PA50CB410	COPPER	208.100	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB410	IRON	17562.900	MG/KG					
IR50	PA50CB410	LEAD	355.080	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB410	MAGNESIUM	3304.180	MG/KG					
IR50	PA50CB410	MANGANESE	303.890	MG/KG					
IR50	PA50CB410	MOLYBDENUM	21.110	MG/KG			>	2.68	
IR50	PA50CB410	NICKEL	49.630	MG/KG	>	20.90			
IR50	PA50CB410	POTASSIUM	1176.250	MG/KG					
IR50	PA50CB410	SILVER	1.160	MG/KG	>	1.00		1.43	
IR50	PA50CB410	SODIUM	157.890	MG/KG					
IR50	PA50CB410	VANADIUM	34.440	MG/KG				117.17	
IR50	PA50CB410	ZINC	670.310	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB410	AROCLOR-1248	1500.000	UG/KG	>	22.70			
IR50	PA50CB410	AROCLOR-1260	840.000	UG/KG	>	22.70			
IR50	PA50CB410	2,4-DIMETHYLPHENOL	2591.500	UG/KG					
IR50	PA50CB410	4-METHYLPHENOL	1175.440	UG/KG					
IR50	PA50CB410	TRICHLOROETHENE	45.240	UG/KG					
IR50	PA50CB410	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	560.000	MG/KG					
IR50	PA50CB410	PH	7.200	PH		><		><	
IR50	PA50CB410	TPH-DIESEL	790.000	MG/KG					
IR50	PA50CB411	% SOLIDS	87.800	%					
IR50	PA50CB411	MERCURY	0.110	MG/KG		0.15		2.28	
IR50	PA50CB411	ARSENIC	4.590	MG/KG		8.20			
IR50	PA50CB411	ALUMINUM	8102.820	MG/KG					
IR50	PA50CB411	BARIUM	77.750	MG/KG				314.36	
IR50	PA50CB411	CALCIUM	8612.680	MG/KG					
IR50	PA50CB411	CHROMIUM	62.670	MG/KG		81.00			
IR50	PA50CB411	COBALT	12.400	MG/KG					
IR50	PA50CB411	COPPER	127.380	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB411	IRON	20330.400	MG/KG					
IR50	PA50CB411	LEAD	264.950	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB411	MAGNESIUM	7046.920	MG/KG					
IR50	PA50CB411	MANGANESE	353.750	MG/KG					
IR50	PA50CB411	MOLYBDENUM	19.740	MG/KG			>	2.68	
IR50	PA50CB411	NICKEL	70.100	MG/KG	>	20.90			

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

RCEL D
ATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50CB411	SODIUM	362.010	MG/KG					
IR50	PA50CB411	VANADIUM	38.280	MG/KG				117.17	
IR50	PA50CB411	ZINC	277.100	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB411	AROCLOR-1260	1600.000	UG/KG	>	22.70			
IR50	PA50CB411	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	1100.000	MG/KG					
IR50	PA50CB411	PH	7.400	PH		><		><	
IR50	PA50CB411	TPH-DIESEL	190.000	MG/KG					
IR50	PA50CB412	% SOLIDS	73.700	%					
IR50	PA50CB412	MERCURY	0.070	MG/KG		0.15		2.28	
IR50	PA50CB412	ARSENIC	6.790	MG/KG		8.20			
IR50	PA50CB412	ALUMINUM	15196.100	MG/KG					
IR50	PA50CB412	BARIUM	176.110	MG/KG				314.36	
IR50	PA50CB412	CALCIUM	12792.000	MG/KG					
IR50	PA50CB412	CHROMIUM	169.610	MG/KG	>	81.00			
IR50	PA50CB412	COBALT	24.450	MG/KG					
IR50	PA50CB412	COPPER	563.480	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB412	IRON	33370.900	MG/KG					
IR50	PA50CB412	LEAD	507.660	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB412	MAGNESIUM	12244.500	MG/KG					
IR50	PA50CB412	MANGANESE	612.360	MG/KG					
IR50	PA50CB412	NICKEL	105.140	MG/KG	>	20.90			
IR50	PA50CB412	POTASSIUM	1889.930	MG/KG					
IR50	PA50CB412	SODIUM	597.240	MG/KG					
IR50	PA50CB412	VANADIUM	95.280	MG/KG				117.17	
IR50	PA50CB412	ZINC	984.050	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB412	AROCLOR-1260	3000.000	UG/KG	>	22.70			
IR50	PA50CB412	ANTHRACENE	337.960	UG/KG	>	85.30			
IR50	PA50CB412	BENZO(A)ANTHRACENE	429.450	UG/KG	>	261.00			
IR50	PA50CB412	BENZO(A)PYRENE	553.110	UG/KG	>	430.00			
IR50	PA50CB412	BENZO(B)FLUORANTHENE	1114.940	UG/KG					
IR50	PA50CB412	BENZO(G,H,I)PERYLENE	387.400	UG/KG					
IR50	PA50CB412	BENZO(K)FLUORANTHENE	775.580	UG/KG					
IR50	PA50CB412	BIS(2-ETHYLHEXYL)PHTHALATE	2447.800	UG/KG					
IR50	PA50CB412	CHRYSENE	1418.420	UG/KG	>	384.00			
IR50	PA50CB412	FLUORANTHENE	583.140	UG/KG		600.00			
IR50	PA50CB412	INDENO(1,2,3-CD)PYRENE	330.870	UG/KG					
IR50	PA50CB412	PHENANTHRENE	200.710	UG/KG		240.00			
IR50	PA50CB412	PYRENE	566.560	UG/KG		668.00			
IR50	PA50CB412	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	34.000	MG/KG					
IR50	PA50CB412	PH	7.500	PH		><		><	
IR50	PA50CB412	TPH-DIESEL	94.000	MG/KG					
IR50	PA50CB413	% SOLIDS	65.800	%					
IR50	PA50CB413	MERCURY	0.380	MG/KG	>	0.15		2.28	
IR50	PA50CB413	ARSENIC	15.560	MG/KG	>	8.20			
IR50	PA50CB413	ALUMINUM	21019.000	MG/KG					
IR50	PA50CB413	BARIUM	199.040	MG/KG				314.36	
IR50	PA50CB413	CADMIUM	4.230	MG/KG	>	1.20	>	3.14	*
IR50	PA50CB413	CALCIUM	11511.700	MG/KG					
IR50	PA50CB413	CHROMIUM	222.760	MG/KG	>	81.00			
IR50	PA50CB413	COBALT	37.520	MG/KG					
IR50	PA50CB413	COPPER	578.390	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB413	IRON	49201.100	MG/KG					
IR50	PA50CB413	LEAD	479.280	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB413	MAGNESIUM	22911.300	MG/KG					
IR50	PA50CB413	MANGANESE	1310.540	MG/KG					
IR50	PA50CB413	NICKEL	245.490	MG/KG	>	20.90			
IR50	PA50CB413	POTASSIUM	2074.080	MG/KG					
IR50	PA50CB413	SODIUM	247.700	MG/KG					
IR50	PA50CB413	VANADIUM	144.330	MG/KG			>	117.17	
IR50	PA50CB413	ZINC	1762.750	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB413	AROCLOR-1260	610.000	UG/KG	>	22.70			
IR50	PA50CB413	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	36.000	MG/KG					
IR50	PA50CB413	PH	6.900	PH		><		><	
IR50	PA50CB413	TPH-DIESEL	120.000	MG/KG					
IR50	PA50CB414	CYANIDE	1.100	MG/KG					
IR50	PA50CB414	MERCURY	0.160	MG/KG	>	0.15		2.28	

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL D
STATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50CB414	ARSENIC	17.500	MG/KG	>	8.20			
IR50	PA50CB414	ALUMINUM	10400.000	MG/KG					
IR50	PA50CB414	BARIUM	484.000	MG/KG			>	314.36	
IR50	PA50CB414	CADMIUM	4.200	MG/KG	>	1.20	>	3.14	*
IR50	PA50CB414	CALCIUM	11400.000	MG/KG					
IR50	PA50CB414	CHROMIUM	190.000	MG/KG	>	81.00			
IR50	PA50CB414	COPPER	190.000	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB414	IRON	139000.000	MG/KG					
IR50	PA50CB414	LEAD	4910.000	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB414	MAGNESIUM	7310.000	MG/KG					
IR50	PA50CB414	MANGANESE	802.000	MG/KG					
IR50	PA50CB414	MOLYBDENUM	11.300	MG/KG			>	2.68	
IR50	PA50CB414	NICKEL	75.700	MG/KG	>	20.90			
IR50	PA50CB414	POTASSIUM	1320.000	MG/KG					
IR50	PA50CB414	SILVER	1.400	MG/KG	>	1.00		1.43	
IR50	PA50CB414	SODIUM	5040.000	MG/KG					
IR50	PA50CB414	VANADIUM	40.200	MG/KG				117.17	
IR50	PA50CB414	ZINC	2870.000	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB414	AROCLOR-1254	32.000	UG/KG	>	22.70			
IR50	PA50CB414	AROCLOR-1260	60.000	UG/KG	>	22.70			
IR50	PA50CB414	2-METHYLNAPHTHALENE	500.000	UG/KG	>	70.00			
IR50	PA50CB414	ACENAPHTHENE	1800.000	UG/KG	>	16.00			
IR50	PA50CB414	ANTHRACENE	1800.000	UG/KG	>	85.30			
IR50	PA50CB414	BENZO(A)ANTHRACENE	4100.000	UG/KG	>	261.00			
IR50	PA50CB414	BENZO(A)PYRENE	28000.000	UG/KG	>	430.00			
IR50	PA50CB414	BENZO(B)FLUORANTHENE	6300.000	UG/KG					
IR50	PA50CB414	BENZO(G,H,I)PERYLENE	1000.000	UG/KG					
IR50	PA50CB414	BENZO(K)FLUORANTHENE	1400.000	UG/KG					
IR50	PA50CB414	BUTYLBENZYLPHTHALATE	920.000	UG/KG					
IR50	PA50CB414	CARBAZOLE	2300.000	UG/KG					
IR50	PA50CB414	CHRYSENE	3600.000	UG/KG	>	384.00			
IR50	PA50CB414	DI-N-BUTYLPHTHALATE	360.000	UG/KG					
IR50	PA50CB414	DIBENZOFURAN	1200.000	UG/KG					
IR50	PA50CB414	DIMETHYLPHTHALATE	2400.000	UG/KG					
IR50	PA50CB414	FLUORANTHENE	12000.000	UG/KG	>	600.00			
IR50	PA50CB414	FLUORENE	2000.000	UG/KG	>	19.00			
IR50	PA50CB414	INDENO(1,2,3-CD)PYRENE	1300.000	UG/KG					
IR50	PA50CB414	NAPHTHALENE	1200.000	UG/KG	>	160.00			
IR50	PA50CB414	PHENANTHRENE	10000.000	UG/KG	>	240.00			
IR50	PA50CB414	PYRENE	7900.000	UG/KG	>	668.00			
IR50	PA50CB414	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	6100.000	MG/KG					
IR50	PA50CB414	PH	7.800	PH		><		><	
IR50	PA50CB414	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	1500.000	MG/KG					
IR50	PA50CB415	MERCURY	0.400	MG/KG	>	0.15		2.28	
IR50	PA50CB415	ARSENIC	5.100	MG/KG		8.20			
IR50	PA50CB415	ALUMINUM	6970.000	MG/KG					
IR50	PA50CB415	BARIUM	54.700	MG/KG				314.36	
IR50	PA50CB415	BERYLLIUM	0.260	MG/KG				0.71	
IR50	PA50CB415	CADMIUM	2.000	MG/KG	>	1.20		3.14	
IR50	PA50CB415	CALCIUM	19200.000	MG/KG					
IR50	PA50CB415	CHROMIUM	397.000	MG/KG	>	81.00			
IR50	PA50CB415	COPPER	306.000	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB415	IRON	62300.000	MG/KG					
IR50	PA50CB415	LEAD	1470.000	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB415	MAGNESIUM	10700.000	MG/KG					
IR50	PA50CB415	MANGANESE	653.000	MG/KG					
IR50	PA50CB415	MOLYBDENUM	7.800	MG/KG			>	2.68	
IR50	PA50CB415	NICKEL	164.000	MG/KG	>	20.90			
IR50	PA50CB415	POTASSIUM	913.000	MG/KG					
IR50	PA50CB415	SODIUM	2650.000	MG/KG					
IR50	PA50CB415	VANADIUM	26.700	MG/KG				117.17	
IR50	PA50CB415	ZINC	1940.000	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB415	4,4'-DDD	12.000	UG/KG					
IR50	PA50CB415	4,4'-DDE	12.000	UG/KG	>	2.20			
IR50	PA50CB415	AROCLOR-1254	37.000	UG/KG	>	22.70			
IR50	PA50CB415	AROCLOR-1260	45.000	UG/KG	>	22.70			

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

CEL D
TION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50CB415	ACENAPHTHENE	430.000	UG/KG	>	16.00			
IR50	PA50CB415	ANTHRACENE	750.000	UG/KG	>	85.30			
IR50	PA50CB415	BENZO(A)ANTHRACENE	1700.000	UG/KG	>	261.00			
IR50	PA50CB415	BENZO(A)PYRENE	760.000	UG/KG	>	430.00			
IR50	PA50CB415	BENZO(B)FLUORANTHENE	2500.000	UG/KG					
IR50	PA50CB415	BENZO(G,H,I)PERYLENE	510.000	UG/KG					
IR50	PA50CB415	CHRYSENE	1400.000	UG/KG	>	384.00			
IR50	PA50CB415	DIBENZOFURAN	310.000	UG/KG					
IR50	PA50CB415	FLUORANTHENE	3600.000	UG/KG	>	600.00			
IR50	PA50CB415	FLUORENE	680.000	UG/KG	>	19.00			
IR50	PA50CB415	INDENO(1,2,3-CD)PYRENE	490.000	UG/KG					
IR50	PA50CB415	PHENANTHRENE	2200.000	UG/KG	>	240.00			
IR50	PA50CB415	PYRENE	3000.000	UG/KG	>	668.00			
IR50	PA50CB415	2-BUTANONE	3.000	UG/KG					
IR50	PA50CB415	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	4800.000	MG/KG					
IR50	PA50CB415	PH	8.400	PH		><		><	
IR50	PA50CB415	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	1000.000	MG/KG					
IR50	PA50CB415	TPH-PURGEABLE UNKNOWN HYDROCARBON	7.900	MG/KG					
IR50	PA50CB416	MERCURY	0.130	MG/KG		0.15		2.28	
IR50	PA50CB416	ARSENIC	7.900	MG/KG		8.20			
IR50	PA50CB416	ALUMINUM	9840.000	MG/KG					
IR50	PA50CB416	BARIUM	135.000	MG/KG				314.36	
IR50	PA50CB416	CADMIUM	3.000	MG/KG	>	1.20		3.14	
IR50	PA50CB416	CALCIUM	8520.000	MG/KG					
IR50	PA50CB416	CHROMIUM	151.000	MG/KG	>	81.00			
IR50	PA50CB416	COPPER	153.000	MG/KG	>	34.00	>	124.31	*
IR50	PA50CB416	IRON	29400.000	MG/KG					
IR50	PA50CB416	LEAD	822.000	MG/KG	>	46.70	>	8.99	*
IR50	PA50CB416	MAGNESIUM	9550.000	MG/KG					
IR50	PA50CB416	MANGANESE	376.000	MG/KG					
IR50	PA50CB416	MOLYBDENUM	6.200	MG/KG			>	2.68	
IR50	PA50CB416	NICKEL	128.000	MG/KG	>	20.90			
IR50	PA50CB416	POTASSIUM	1690.000	MG/KG					
IR50	PA50CB416	SODIUM	2910.000	MG/KG					
IR50	PA50CB416	VANADIUM	38.100	MG/KG				117.17	
IR50	PA50CB416	ZINC	648.000	MG/KG	>	150.00	>	109.86	*
IR50	PA50CB416	AROCLOR-1260	540.000	UG/KG	>	22.70			
IR50	PA50CB416	ANTHRACENE	220.000	UG/KG	>	85.30			
IR50	PA50CB416	BENZO(A)ANTHRACENE	700.000	UG/KG	>	261.00			
IR50	PA50CB416	BENZO(A)PYRENE	490.000	UG/KG	>	430.00			
IR50	PA50CB416	BENZO(B)FLUORANTHENE	1000.000	UG/KG					
IR50	PA50CB416	BENZO(G,H,I)PERYLENE	170.000	UG/KG					
IR50	PA50CB416	BENZO(K)FLUORANTHENE	380.000	UG/KG					
IR50	PA50CB416	CARBAZOLE	160.000	UG/KG					
IR50	PA50CB416	CHRYSENE	930.000	UG/KG	>	384.00			
IR50	PA50CB416	FLUORANTHENE	2000.000	UG/KG	>	600.00			
IR50	PA50CB416	INDENO(1,2,3-CD)PYRENE	210.000	UG/KG					
IR50	PA50CB416	PHENANTHRENE	920.000	UG/KG	>	240.00			
IR50	PA50CB416	PYRENE	1600.000	UG/KG	>	668.00			
IR50	PA50CB416	1,1,1-TRICHLOROETHANE	5.000	UG/KG					
IR50	PA50CB416	1,1-DICHLOROETHANE	170.000	UG/KG					
IR50	PA50CB416	2-BUTANONE	3.000	UG/KG					
IR50	PA50CB416	CHLOROETHANE	330.000	UG/KG					
IR50	PA50CB416	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	1300.000	MG/KG					
IR50	PA50CB416	PH	7.900	PH		><		><	
IR50	PA50CB416	TPH-EXTRACTABLE UNKNOWN HYDROCARBON	1000.000	MG/KG					
IR50	PA50FC418	% SOLIDS	44.100	%					
IR50	PA50FC418	CYANIDE	0.480	MG/KG					
IR50	PA50FC418	MERCURY	0.760	MG/KG	>	0.15		2.28	
IR50	PA50FC418	ARSENIC	6.880	MG/KG		8.20			
IR50	PA50FC418	ALUMINUM	7622.440	MG/KG					
IR50	PA50FC418	BARIUM	160.880	MG/KG				314.36	
IR50	PA50FC418	CALCIUM	10300.000	MG/KG					
IR50	PA50FC418	CHROMIUM	75.640	MG/KG		81.00			
IR50	PA50FC418	COBALT	53.460	MG/KG					
IR50	PA50FC418	COPPER	269.520	MG/KG	>	34.00	>	124.31	*

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL D
STATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50FC418	IRON	238513.000	MG/KG					
IR50	PA50FC418	LEAD	196.350	MG/KG	>	46.70	>	8.99	*
IR50	PA50FC418	MAGNESIUM	10784.700	MG/KG					
IR50	PA50FC418	MANGANESE	7388.940	MG/KG					
IR50	PA50FC418	MOLYBDENUM	10.340	MG/KG			>	2.68	
IR50	PA50FC418	NICKEL	117.900	MG/KG	>	20.90			
IR50	PA50FC418	POTASSIUM	1366.340	MG/KG					
IR50	PA50FC418	SILVER	5.130	MG/KG	>	1.00	>	1.43	*
IR50	PA50FC418	SODIUM	5753.690	MG/KG					
IR50	PA50FC418	VANADIUM	6.820	MG/KG				117.17	
IR50	PA50FC418	ZINC	773.380	MG/KG	>	150.00	>	109.86	*
IR50	PA50FC418	AROCLOR-1260	1000.000	UG/KG	>	22.70			
IR50	PA50FC418	BIS(2-ETHYLHEXYL)PHTHALATE	8899.500	UG/KG					
IR50	PA50FC418	ACETONE	176.110	UG/KG					
IR50	PA50FC418	CARBON DISULFIDE	11.270	UG/KG					
IR50	PA50FC418	ETHYLBENZENE	17.740	UG/KG					
IR50	PA50FC418	XYLENE (TOTAL)	143.440	UG/KG					
IR50	PA50FC418	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	42.000	MG/KG					
IR50	PA50FC418	PH	7.900	PH		><		><	
IR50	PA50FC418	TPH-DIESEL	410.000	MG/KG					
IR50	PA50SW419	% SOLIDS	81.400	%					
IR50	PA50SW419	MERCURY	0.190	MG/KG	>	0.15		2.28	
IR50	PA50SW419	LEAD	344.340	MG/KG	>	46.70	>	8.99	*
IR50	PA50SW419	ALUMINUM	5073.140	MG/KG					
IR50	PA50SW419	BARIUM	38.810	MG/KG				314.36	
IR50	PA50SW419	CADMIUM	0.970	MG/KG		1.20		3.14	
IR50	PA50SW419	CALCIUM	15676.500	MG/KG					
IR50	PA50SW419	CHROMIUM	59.820	MG/KG		81.00			
IR50	PA50SW419	COBALT	9.570	MG/KG					
IR50	PA50SW419	COPPER	64.060	MG/KG	>	34.00		124.31	
IR50	PA50SW419	IRON	14161.800	MG/KG					
IR50	PA50SW419	MAGNESIUM	13324.300	MG/KG					
IR50	PA50SW419	MANGANESE	209.170	MG/KG					
IR50	PA50SW419	NICKEL	122.700	MG/KG	>	20.90			
IR50	PA50SW419	POTASSIUM	408.460	MG/KG					
IR50	PA50SW419	SILVER	2.870	MG/KG	>	1.00	>	1.43	*
IR50	PA50SW419	SODIUM	621.480	MG/KG					
IR50	PA50SW419	VANADIUM	21.170	MG/KG				117.17	
IR50	PA50SW419	ZINC	298.250	MG/KG	>	150.00	>	109.86	*
IR50	PA50SW419	AROCLOR-1260	280.000	UG/KG	>	22.70			
IR50	PA50SW419	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	700.000	MG/KG					
IR50	PA50SW419	PH	8.900	PH		><		><	
IR50	PA50SW419	TPH-DIESEL	82.000	MG/KG					
IR57	PA57SW01	% SOLIDS	75.100	%					
IR57	PA57SW01	MERCURY	0.780	MG/KG	>	0.15		2.28	
IR57	PA57SW01	ARSENIC	88.660	MG/KG	>	8.20			
IR57	PA57SW01	ALUMINUM	10182.200	MG/KG					
IR57	PA57SW01	ANTIMONY	23.060	MG/KG			>	9.05	
IR57	PA57SW01	BARIUM	538.250	MG/KG			>	314.36	
IR57	PA57SW01	CADMIUM	2.560	MG/KG	>	1.20		3.14	
IR57	PA57SW01	CALCIUM	26559.300	MG/KG					
IR57	PA57SW01	CHROMIUM	244.300	MG/KG	>	81.00			
IR57	PA57SW01	COBALT	35.670	MG/KG					
IR57	PA57SW01	COPPER	3340.870	MG/KG	>	34.00	>	124.31	*
IR57	PA57SW01	IRON	74160.800	MG/KG					
IR57	PA57SW01	LEAD	787.280	MG/KG	>	46.70	>	8.99	*
IR57	PA57SW01	MAGNESIUM	9077.760	MG/KG					
IR57	PA57SW01	MANGANESE	726.440	MG/KG					
IR57	PA57SW01	MOLYBDENUM	243.390	MG/KG			>	2.68	
IR57	PA57SW01	NICKEL	269.940	MG/KG	>	20.90			
IR57	PA57SW01	POTASSIUM	1526.310	MG/KG					
IR57	PA57SW01	SILVER	4.990	MG/KG	>	1.00	>	1.43	*
IR57	PA57SW01	SODIUM	486.330	MG/KG					
IR57	PA57SW01	VANADIUM	46.410	MG/KG				117.17	
IR57	PA57SW01	ZINC	2284.150	MG/KG	>	150.00	>	109.86	*
IR57	PA57SW01	AROCLOR-1260	1500.000	UG/KG	>	22.70			

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

ICEL D
.ATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR57	PA57SW01	FLUORANTHENE	932.930	UG/KG	>	600.00			
IR57	PA57SW01	PHENANTHRENE	506.870	UG/KG	>	240.00			
IR57	PA57SW01	PYRENE	959.080	UG/KG	>	668.00			
IR57	PA57SW01	PH	8.100	PH		><		><	
IR57	PA57SW01	TOTAL OIL & GREASE	7100.000	MG/KG					
IR57	PA57SW01	TPH-DIESEL	230.000	MG/KG					
IR57	PA57SW02	% SOLIDS	64.100	%					
IR57	PA57SW02	MERCURY	0.810	MG/KG	>	0.15		2.28	
IR57	PA57SW02	ARSENIC	19.350	MG/KG	>	8.20			
IR57	PA57SW02	ALUMINUM	25200.200	MG/KG					
IR57	PA57SW02	BARIUM	391.850	MG/KG			>	314.36	
IR57	PA57SW02	CALCIUM	95749.900	MG/KG					
IR57	PA57SW02	CHROMIUM	284.770	MG/KG	>	81.00			
IR57	PA57SW02	COBALT	58.740	MG/KG					
IR57	PA57SW02	COPPER	2233.810	MG/KG	>	34.00	>	124.31	*
IR57	PA57SW02	IRON	121673.000	MG/KG					
IR57	PA57SW02	LEAD	423.470	MG/KG	>	46.70	>	8.99	*
IR57	PA57SW02	MAGNESIUM	17570.400	MG/KG					
IR57	PA57SW02	MANGANESE	2171.020	MG/KG					
IR57	PA57SW02	MOLYBDENUM	26.910	MG/KG			>	2.68	
IR57	PA57SW02	NICKEL	84.810	MG/KG	>	20.90			
IR57	PA57SW02	POTASSIUM	3120.900	MG/KG					
IR57	PA57SW02	SILVER	7.900	MG/KG	>	1.00	>	1.43	*
IR57	PA57SW02	SODIUM	969.940	MG/KG					
IR57	PA57SW02	VANADIUM	105.250	MG/KG				117.17	
IR57	PA57SW02	ZINC	46706.400	MG/KG	>	150.00	>	109.86	*
IR57	PA57SW02	AROCLOR-1260	250.000	UG/KG	>	22.70			
IR57	PA57SW02	PH	8.600	PH		><		><	
IR57	PA57SW02	TOTAL OIL & GREASE	5400.000	MG/KG					
IR57	PA57SW02	TPH-DIESEL	310.000	MG/KG					
IR57	PA57SW03	% SOLIDS	74.400	%					
IR57	PA57SW03	CYANIDE	0.130	MG/KG					
IR57	PA57SW03	MERCURY	0.520	MG/KG	>	0.15		2.28	
IR57	PA57SW03	ARSENIC	56.260	MG/KG	>	8.20			
IR57	PA57SW03	ALUMINUM	10732.800	MG/KG					
IR57	PA57SW03	ANTIMONY	21.070	MG/KG			>	9.05	
IR57	PA57SW03	BARIUM	393.300	MG/KG			>	314.36	
IR57	PA57SW03	CALCIUM	31845.000	MG/KG					
IR57	PA57SW03	CHROMIUM	105.620	MG/KG	>	81.00			
IR57	PA57SW03	COBALT	31.080	MG/KG					
IR57	PA57SW03	COPPER	1356.770	MG/KG	>	34.00	>	124.31	*
IR57	PA57SW03	IRON	75863.800	MG/KG					
IR57	PA57SW03	LEAD	487.360	MG/KG	>	46.70	>	8.99	*
IR57	PA57SW03	MAGNESIUM	8621.470	MG/KG					
IR57	PA57SW03	MANGANESE	793.960	MG/KG					
IR57	PA57SW03	MOLYBDENUM	237.680	MG/KG			>	2.68	
IR57	PA57SW03	NICKEL	72.790	MG/KG	>	20.90			
IR57	PA57SW03	POTASSIUM	1485.120	MG/KG					
IR57	PA57SW03	SODIUM	643.840	MG/KG					
IR57	PA57SW03	VANADIUM	59.730	MG/KG				117.17	
IR57	PA57SW03	ZINC	1594.570	MG/KG	>	150.00	>	109.86	*
IR57	PA57SW03	AROCLOR-1260	3000.000	UG/KG	>	22.70			
IR57	PA57SW03	BIS(2-ETHYLHEXYL)PHTHALATE	6384.940	UG/KG					
IR57	PA57SW03	FLUORANTHENE	357.780	UG/KG		600.00			
IR57	PA57SW03	PHENANTHRENE	407.740	UG/KG	>	240.00			
IR57	PA57SW03	PYRENE	596.680	UG/KG		668.00			
IR57	PA57SW03	PH	9.200	PH		><		><	
IR57	PA57SW03	TOTAL OIL & GREASE	8200.000	MG/KG					
IR57	PA57SW03	TPH-DIESEL	360.000	MG/KG					
IR57	PA57SW04	% SOLIDS	73.500	%					
IR57	PA57SW04	MERCURY	0.280	MG/KG	>	0.15		2.28	
IR57	PA57SW04	ARSENIC	28.150	MG/KG	>	8.20			
IR57	PA57SW04	ALUMINUM	7465.150	MG/KG					
IR57	PA57SW04	ANTIMONY	12.600	MG/KG			>	9.05	
IR57	PA57SW04	BARIUM	664.590	MG/KG			>	314.36	
IR57	PA57SW04	CALCIUM	21942.400	MG/KG					

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL D
STATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR57	PA57SW04	CHROMIUM	89.110	MG/KG	>	81.00			
IR57	PA57SW04	COBALT	25.530	MG/KG					
IR57	PA57SW04	COPPER	1774.060	MG/KG	>	34.00	>	124.31	*
IR57	PA57SW04	IRON	64738.000	MG/KG					
IR57	PA57SW04	LEAD	1200.680	MG/KG	>	46.70	>	8.99	*
IR57	PA57SW04	MAGNESIUM	5582.210	MG/KG					
IR57	PA57SW04	MANGANESE	649.690	MG/KG					
IR57	PA57SW04	MOLYBDENUM	38.460	MG/KG			>	2.68	
IR57	PA57SW04	NICKEL	49.960	MG/KG	>	20.90			
IR57	PA57SW04	POTASSIUM	967.600	MG/KG					
IR57	PA57SW04	SODIUM	331.580	MG/KG					
IR57	PA57SW04	VANADIUM	34.290	MG/KG				117.17	
IR57	PA57SW04	ZINC	929.010	MG/KG	>	150.00	>	109.86	*
IR57	PA57SW04	AROCLOR-1260	1300.000	UG/KG	>	22.70			
IR57	PA57SW04	FLUORANTHENE	845.320	UG/KG	>	600.00			
IR57	PA57SW04	PHENANTHRENE	735.950	UG/KG	>	240.00			
IR57	PA57SW04	PYRENE	739.900	UG/KG	>	668.00			
IR57	PA57SW04	PH	8.400	PH		><		><	
IR57	PA57SW04	TOTAL OIL & GREASE	4200.000	MG/KG					
IR57	PA57SW04	TPH-DIESEL	190.000	MG/KG					
IR57	PA57SW05	% SOLIDS	77.200	%					
IR57	PA57SW05	CYANIDE	0.150	MG/KG					
IR57	PA57SW05	MERCURY	0.880	MG/KG	>	0.15		2.28	
IR57	PA57SW05	ARSENIC	76.810	MG/KG	>	8.20			
IR57	PA57SW05	ALUMINUM	8400.700	MG/KG					
IR57	PA57SW05	ANTIMONY	31.500	MG/KG			>	9.05	
IR57	PA57SW05	BARIUM	269.100	MG/KG				314.36	
IR57	PA57SW05	CALCIUM	26242.300	MG/KG					
IR57	PA57SW05	CHROMIUM	198.870	MG/KG	>	81.00			
IR57	PA57SW05	COBALT	33.990	MG/KG					
IR57	PA57SW05	COPPER	2226.910	MG/KG	>	34.00	>	124.31	*
IR57	PA57SW05	IRON	71489.800	MG/KG					
IR57	PA57SW05	LEAD	326.390	MG/KG	>	46.70	>	8.99	*
IR57	PA57SW05	MAGNESIUM	8351.200	MG/KG					
IR57	PA57SW05	MANGANESE	573.880	MG/KG					
IR57	PA57SW05	MOLYBDENUM	485.560	MG/KG			>	2.68	
IR57	PA57SW05	NICKEL	66.210	MG/KG	>	20.90			
IR57	PA57SW05	POTASSIUM	1704.210	MG/KG					
IR57	PA57SW05	SODIUM	757.760	MG/KG					
IR57	PA57SW05	VANADIUM	29.950	MG/KG				117.17	
IR57	PA57SW05	ZINC	777.040	MG/KG	>	150.00	>	109.86	*
IR57	PA57SW05	AROCLOR-1260	190.000	UG/KG	>	22.70			
IR57	PA57SW05	PH	9.600	PH		><		><	
IR57	PA57SW05	TOTAL OIL & GREASE	2200.000	MG/KG					
IR57	PA57SW05	TPH-DIESEL	500.000	MG/KG					
IR57	PA57SW06	% SOLIDS	81.500	%					
IR57	PA57SW06	MERCURY	0.160	MG/KG	>	0.15		2.28	
IR57	PA57SW06	ARSENIC	11.830	MG/KG	>	8.20			
IR57	PA57SW06	ALUMINUM	9663.780	MG/KG					
IR57	PA57SW06	ANTIMONY	9.890	MG/KG			>	9.05	
IR57	PA57SW06	BARIUM	251.830	MG/KG				314.36	
IR57	PA57SW06	CALCIUM	29656.600	MG/KG					
IR57	PA57SW06	CHROMIUM	189.060	MG/KG	>	81.00			
IR57	PA57SW06	COBALT	20.890	MG/KG					
IR57	PA57SW06	COPPER	817.740	MG/KG	>	34.00	>	124.31	*
IR57	PA57SW06	IRON	41969.700	MG/KG					
IR57	PA57SW06	LEAD	226.740	MG/KG	>	46.70	>	8.99	*
IR57	PA57SW06	MAGNESIUM	8780.210	MG/KG					
IR57	PA57SW06	MANGANESE	692.480	MG/KG					
IR57	PA57SW06	MOLYBDENUM	35.330	MG/KG			>	2.68	
IR57	PA57SW06	NICKEL	159.830	MG/KG	>	20.90			
IR57	PA57SW06	POTASSIUM	1248.200	MG/KG					
IR57	PA57SW06	SODIUM	1084.730	MG/KG					
IR57	PA57SW06	VANADIUM	39.590	MG/KG				117.17	
IR57	PA57SW06	ZINC	674.580	MG/KG	>	150.00	>	109.86	*
IR57	PA57SW06	AROCLOR-1260	280.000	UG/KG	>	22.70			

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

RCEL D
ATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR57	PA57SW06	FLUORANTHENE	1305.480	UG/KG	>	600.00			
IR57	PA57SW06	PYRENE	1257.570	UG/KG	>	668.00			
IR57	PA57SW06	CARBON DISULFIDE	9.250	UG/KG					
IR57	PA57SW06	PH	9.400	PH		><		><	
IR57	PA57SW06	TOTAL OIL & GREASE	6200.000	MG/KG					
IR57	PA57SW06	TPH-DIESEL	420.000	MG/KG					
IR57	PA57SW07	% SOLIDS	76.200	%					
IR57	PA57SW07	MERCURY	0.360	MG/KG	>	0.15		2.28	
IR57	PA57SW07	ARSENIC	60.930	MG/KG	>	8.20			
IR57	PA57SW07	ALUMINUM	11488.400	MG/KG					
IR57	PA57SW07	ANTIMONY	28.870	MG/KG			>	9.05	
IR57	PA57SW07	BARIUM	662.330	MG/KG			>	314.36	
IR57	PA57SW07	CALCIUM	35669.300	MG/KG					
IR57	PA57SW07	CHROMIUM	157.760	MG/KG	>	81.00			
IR57	PA57SW07	COBALT	49.420	MG/KG					
IR57	PA57SW07	COPPER	1577.610	MG/KG	>	34.00	>	124.31	*
IR57	PA57SW07	IRON	135844.000	MG/KG					
IR57	PA57SW07	LEAD	541.890	MG/KG	>	46.70	>	8.99	*
IR57	PA57SW07	MAGNESIUM	7898.650	MG/KG					
IR57	PA57SW07	MANGANESE	1984.600	MG/KG					
IR57	PA57SW07	MOLYBDENUM	601.170	MG/KG			>	2.68	
IR57	PA57SW07	NICKEL	94.430	MG/KG	>	20.90			
IR57	PA57SW07	POTASSIUM	2243.900	MG/KG					
IR57	PA57SW07	SILVER	9.390	MG/KG	>	1.00	>	1.43	*
IR57	PA57SW07	SODIUM	831.440	MG/KG					
IR57	PA57SW07	VANADIUM	49.960	MG/KG				117.17	
IR57	PA57SW07	ZINC	1742.780	MG/KG	>	150.00	>	109.86	*
IR57	PA57SW07	AROCLOR-1260	210.000	UG/KG	>	22.70			
IR57	PA57SW07	BIS(2-ETHYLHEXYL)PHTHALATE	16418.560	UG/KG					
IR57	PA57SW07	PH	7.900	PH		><		><	
IR57	PA57SW07	TOTAL OIL & GREASE	6100.000	MG/KG					
IR57	PA57SW07	TPH-DIESEL	140.000	MG/KG					
IR57	PA57SW09	% SOLIDS	62.300	%					
IR57	PA57SW09	MERCURY	1.470	MG/KG	>	0.15		2.28	
IR57	PA57SW09	ARSENIC	6.420	MG/KG		8.20			
IR57	PA57SW09	ALUMINUM	11318.000	MG/KG					
IR57	PA57SW09	ANTIMONY	12.640	MG/KG			>	9.05	
IR57	PA57SW09	BARIUM	975.770	MG/KG			>	314.36	
IR57	PA57SW09	CADMIUM	2.460	MG/KG	>	1.20		3.14	
IR57	PA57SW09	CALCIUM	25203.800	MG/KG					
IR57	PA57SW09	CHROMIUM	149.540	MG/KG	>	81.00			
IR57	PA57SW09	COBALT	17.850	MG/KG					
IR57	PA57SW09	COPPER	909.710	MG/KG	>	34.00	>	124.31	*
IR57	PA57SW09	IRON	33496.700	MG/KG					
IR57	PA57SW09	LEAD	814.980	MG/KG	>	46.70	>	8.99	*
IR57	PA57SW09	MAGNESIUM	16167.200	MG/KG					
IR57	PA57SW09	MANGANESE	568.500	MG/KG					
IR57	PA57SW09	MOLYBDENUM	15.420	MG/KG			>	2.68	
IR57	PA57SW09	NICKEL	89.650	MG/KG	>	20.90			
IR57	PA57SW09	POTASSIUM	1031.480	MG/KG					
IR57	PA57SW09	SODIUM	1905.130	MG/KG					
IR57	PA57SW09	VANADIUM	49.930	MG/KG				117.17	
IR57	PA57SW09	ZINC	694.150	MG/KG	>	150.00	>	109.86	*
IR57	PA57SW09	AROCLOR-1260	1100.000	UG/KG	>	22.70			
IR57	PA57SW09	PH	9.400	PH		><		><	
IR57	PA57SW09	TOTAL OIL & GREASE	14000.000	MG/KG					
IR57	PA57SW09	TPH-DIESEL	800.000	MG/KG					
IR57	PA57SW10	% SOLIDS	78.000	%					
IR57	PA57SW10	MERCURY	0.310	MG/KG	>	0.15		2.28	
IR57	PA57SW10	ARSENIC	29.690	MG/KG	>	8.20			
IR57	PA57SW10	ALUMINUM	9910.760	MG/KG					
IR57	PA57SW10	ANTIMONY	34.370	MG/KG			>	9.05	
IR57	PA57SW10	BARIUM	283.090	MG/KG				314.36	
IR57	PA57SW10	CALCIUM	18909.600	MG/KG					
IR57	PA57SW10	CHROMIUM	101.600	MG/KG	>	81.00			
IR57	PA57SW10	COBALT	19.920	MG/KG					

NAVAL STATION TREASURE ISLAND HUNTER'S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL D
STATION COUNT 37

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR57	PA57SW10	COPPER	732.450	MG/KG	>	34.00	>	124.31	*
IR57	PA57SW10	IRON	49163.800	MG/KG					
IR57	PA57SW10	LEAD	165.030	MG/KG	>	46.70	>	8.99	*
IR57	PA57SW10	MAGNESIUM	8698.220	MG/KG					
IR57	PA57SW10	MANGANESE	555.890	MG/KG					
IR57	PA57SW10	MOLYBDENUM	143.220	MG/KG			>	2.68	
IR57	PA57SW10	NICKEL	63.120	MG/KG	>	20.90			
IR57	PA57SW10	POTASSIUM	1112.070	MG/KG					
IR57	PA57SW10	SODIUM	1029.600	MG/KG					
IR57	PA57SW10	VANADIUM	39.650	MG/KG				117.17	
IR57	PA57SW10	ZINC	610.760	MG/KG	>	150.00	>	109.86	*
IR57	PA57SW10	AROCLOR-1260	260.000	UG/KG	>	22.70			
IR57	PA57SW10	BENZO(A)ANTHRACENE	629.090	UG/KG	>	261.00			
IR57	PA57SW10	BENZO(A)PYRENE	403.710	UG/KG		430.00			
IR57	PA57SW10	BENZO(B)FLUORANTHENE	612.230	UG/KG					
IR57	PA57SW10	BENZO(K)FLUORANTHENE	507.510	UG/KG					
IR57	PA57SW10	CHRYSENE	984.920	UG/KG	>	384.00			
IR57	PA57SW10	FLUORANTHENE	1193.210	UG/KG	>	600.00			
IR57	PA57SW10	PHENANTHRENE	668.420	UG/KG	>	240.00			
IR57	PA57SW10	PYRENE	1209.400	UG/KG	>	668.00			
IR57	PA57SW10	PH	8.200	PH		><		><	
IR57	PA57SW10	TOTAL OIL & GREASE	6800.000	MG/KG					
IR57	PA57SW10	TPH-DIESEL	120.000	MG/KG					
IR57	PA57SW12	% SOLIDS	75.200	%					
IR57	PA57SW12	MERCURY	0.160	MG/KG	>	0.15		2.28	
IR57	PA57SW12	ARSENIC	34.290	MG/KG	>	8.20			
IR57	PA57SW12	LEAD	256.490	MG/KG	>	46.70	>	8.99	*
IR57	PA57SW12	ALUMINUM	22429.700	MG/KG					
IR57	PA57SW12	ANTIMONY	25.160	MG/KG			>	9.05	
IR57	PA57SW12	BARIUM	563.960	MG/KG			>	314.36	
IR57	PA57SW12	CALCIUM	92681.100	MG/KG					
IR57	PA57SW12	CHROMIUM	86.780	MG/KG	>	81.00			
IR57	PA57SW12	COBALT	48.120	MG/KG					
IR57	PA57SW12	COPPER	1309.580	MG/KG	>	34.00	>	124.31	*
IR57	PA57SW12	IRON	93442.900	MG/KG					
IR57	PA57SW12	MAGNESIUM	16912.200	MG/KG					
IR57	PA57SW12	MANGANESE	1703.810	MG/KG					
IR57	PA57SW12	MOLYBDENUM	36.700	MG/KG			>	2.68	
IR57	PA57SW12	NICKEL	52.720	MG/KG	>	20.90			
IR57	PA57SW12	POTASSIUM	2793.100	MG/KG					
IR57	PA57SW12	SILVER	5.030	MG/KG	>	1.00	>	1.43	*
IR57	PA57SW12	SODIUM	1391.550	MG/KG					
IR57	PA57SW12	VANADIUM	89.130	MG/KG				117.17	
IR57	PA57SW12	ZINC	485.970	MG/KG	>	150.00	>	109.86	*
IR57	PA57SW12	AROCLOR-1260	190.000	UG/KG	>	22.70			
IR57	PA57SW12	PH	8.400	PH		><		><	
IR57	PA57SW12	TOTAL OIL & GREASE	7600.000	MG/KG					
IR57	PA57SW12	TPH-DIESEL	280.000	MG/KG					

NAVAL STATION TREASURE ISLAND HUNTER S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

RCEL E
ATION COUNT 3

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50FC417	% SOLIDS	64.900	%					
IR50	PA50FC417	CYANIDE	0.180	MG/KG					
IR50	PA50FC417	MERCURY	1.670	MG/KG	>	0.15		2.28	
IR50	PA50FC417	ARSENIC	4.690	MG/KG		8.20			
IR50	PA50FC417	ALUMINUM	7958.910	MG/KG					
IR50	PA50FC417	ANTIMONY	14.210	MG/KG			>	9.05	
IR50	PA50FC417	BARIUM	250.610	MG/KG				314.36	
IR50	PA50FC417	BERYLLIUM	0.250	MG/KG				0.71	
IR50	PA50FC417	CADMIUM	4.470	MG/KG	>	1.20	>	3.14	*
IR50	PA50FC417	CALCIUM	4723.750	MG/KG					
IR50	PA50FC417	CHROMIUM	293.030	MG/KG	>	81.00			
IR50	PA50FC417	COBALT	36.370	MG/KG					
IR50	PA50FC417	COPPER	368.210	MG/KG	>	34.00	>	124.31	*
IR50	PA50FC417	IRON	33385.800	MG/KG					
IR50	PA50FC417	LEAD	655.220	MG/KG	>	46.70	>	8.99	*
IR50	PA50FC417	MAGNESIUM	52604.800	MG/KG					
IR50	PA50FC417	MANGANESE	574.840	MG/KG					
IR50	PA50FC417	MOLYBDENUM	2.260	MG/KG				2.68	
IR50	PA50FC417	NICKEL	672.450	MG/KG	>	20.90			
IR50	PA50FC417	POTASSIUM	807.740	MG/KG					
IR50	PA50FC417	SILVER	8.870	MG/KG	>	1.00	>	1.43	*
IR50	PA50FC417	SODIUM	216.630	MG/KG					
IR50	PA50FC417	VANADIUM	43.390	MG/KG				117.17	
IR50	PA50FC417	ZINC	1210.060	MG/KG	>	150.00	>	109.86	*
IR50	PA50FC417	AROCLOR-1248	1200.000	UG/KG	>	22.70			
IR50	PA50FC417	AROCLOR-1260	17000.000	UG/KG	>	22.70			
IR50	PA50FC417	2-METHYLNAPHTHALENE	868.810	UG/KG	>	70.00			
IR50	PA50FC417	ACENAPHTHENE	1718.450	UG/KG	>	16.00			
IR50	PA50FC417	ANTHRACENE	3212.490	UG/KG	>	85.30			
IR50	PA50FC417	BENZO(A)ANTHRACENE	5982.450	UG/KG	>	261.00			
IR50	PA50FC417	BENZO(A)PYRENE	5552.600	UG/KG	>	430.00			
IR50	PA50FC417	BENZO(B)FLUORANTHENE	2802.770	UG/KG					
IR50	PA50FC417	BENZO(K)FLUORANTHENE	3636.380	UG/KG					
IR50	PA50FC417	CARBAZOLE	800.580	UG/KG					
IR50	PA50FC417	CHRYSENE	5456.170	UG/KG	>	384.00			
IR50	PA50FC417	FLUORANTHENE	9098.010	UG/KG	>	600.00			
IR50	PA50FC417	FLUORENE	1996.440	UG/KG	>	19.00			
IR50	PA50FC417	INDENO(1,2,3-CD)PYRENE	2165.290	UG/KG					
IR50	PA50FC417	NAPHTHALENE	2146.580	UG/KG	>	160.00			
IR50	PA50FC417	PHENANTHRENE	19002.670	UG/KG	>	240.00			
IR50	PA50FC417	PYRENE	16279.720	UG/KG	>	668.00			
IR50	PA50FC417	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	180.000	MG/KG					
IR50	PA50FC417	PH	8.000	PH		><		><	
IR50	PA50FC417	TPH-DIESEL	500.000	MG/KG					
IR50	PA50SW500	% SOLIDS	42.100	%					
IR50	PA50SW500	CYANIDE	0.240	MG/KG					
IR50	PA50SW500	MERCURY	0.920	MG/KG	>	0.15		2.28	
IR50	PA50SW500	ARSENIC	8.050	MG/KG		8.20			
IR50	PA50SW500	ALUMINUM	20133.800	MG/KG					
IR50	PA50SW500	BARIUM	182.420	MG/KG				314.36	
IR50	PA50SW500	BERYLLIUM	0.680	MG/KG				0.71	
IR50	PA50SW500	CADMIUM	0.840	MG/KG		1.20		3.14	
IR50	PA50SW500	CALCIUM	7657.860	MG/KG					
IR50	PA50SW500	CHROMIUM	197.200	MG/KG	>	81.00			
IR50	PA50SW500	COBALT	30.180	MG/KG					
IR50	PA50SW500	COPPER	357.450	MG/KG	>	34.00	>	124.31	*
IR50	PA50SW500	IRON	40013.800	MG/KG					
IR50	PA50SW500	LEAD	387.430	MG/KG	>	46.70	>	8.99	*
IR50	PA50SW500	MAGNESIUM	35425.600	MG/KG					
IR50	PA50SW500	MANGANESE	840.080	MG/KG					
IR50	PA50SW500	MOLYBDENUM	1.500	MG/KG				2.68	
IR50	PA50SW500	NICKEL	325.520	MG/KG	>	20.90			
IR50	PA50SW500	POTASSIUM	3054.230	MG/KG					
IR50	PA50SW500	SILVER	0.920	MG/KG		1.00		1.43	
IR50	PA50SW500	SODIUM	7672.740	MG/KG					
IR50	PA50SW500	VANADIUM	89.330	MG/KG				117.17	

NAVAL STATION TREASURE ISLAND HUNTER S POINT ANNEX
STORM DRAIN SEDIMENT SAMPLING ANALYSES

PARCEL E
STATION COUNT 3

SITE	STATION	ANALYTE	VALUE	UNITS	>	ERL	>	BACKGROUND	> ERL AND BACKGROUND
IR50	PA50SW500	ZINC	585.540	MG/KG	>	150.00	>	109.86	*
IR50	PA50SW500	ALPHA-CHLORDANE	8.600	UG/KG					
IR50	PA50SW500	AROCLOR-1260	3500.000	UG/KG	>	22.70			
IR50	PA50SW500	GAMMA-CHLORDANE	7.300	UG/KG					
IR50	PA50SW500	BENZO(A)ANTHRACENE	1900.000	UG/KG	>	261.00			
IR50	PA50SW500	BENZO(A)PYRENE	2200.000	UG/KG	>	430.00			
IR50	PA50SW500	BENZO(B)FLUORANTHENE	2000.000	UG/KG					
IR50	PA50SW500	BENZO(K)FLUORANTHENE	1600.000	UG/KG					
IR50	PA50SW500	BIS(2-ETHYLHEXYL)PHTHALATE	2300.000	UG/KG					
IR50	PA50SW500	CHRYSENE	2100.000	UG/KG	>	384.00			
IR50	PA50SW500	FLUORANTHENE	3200.000	UG/KG	>	600.00			
IR50	PA50SW500	PHENANTHRENE	3400.000	UG/KG	>	240.00			
IR50	PA50SW500	PYRENE	6200.000	UG/KG	>	668.00			
IR50	PA50SW500	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	33.000	MG/KG					
IR50	PA50SW500	PH	8.500	PH		><		><	
IR50	PA50SW500	TPH-DIESEL	690.000	MG/KG					
IR50	PA50SW501	% SOLIDS	30.800	%					
IR50	PA50SW501	CYANIDE	0.240	MG/KG					
IR50	PA50SW501	MERCURY	1.660	MG/KG	>	0.15		2.28	
IR50	PA50SW501	ARSENIC	9.350	MG/KG	>	8.20			
IR50	PA50SW501	SELENIUM	2.330	MG/KG			>	1.95	
IR50	PA50SW501	ALUMINUM	13334.300	MG/KG					
IR50	PA50SW501	BARIUM	263.480	MG/KG				314.36	
IR50	PA50SW501	BERYLLIUM	0.490	MG/KG				0.71	
IR50	PA50SW501	CADMIUM	5.290	MG/KG	>	1.20	>	3.14	*
IR50	PA50SW501	CALCIUM	24296.600	MG/KG					
IR50	PA50SW501	CHROMIUM	167.010	MG/KG	>	81.00			
IR50	PA50SW501	COBALT	25.800	MG/KG					
IR50	PA50SW501	COPPER	312.280	MG/KG	>	34.00	>	124.31	*
IR50	PA50SW501	IRON	31194.000	MG/KG					
IR50	PA50SW501	LEAD	500.600	MG/KG	>	46.70	>	8.99	*
IR50	PA50SW501	MAGNESIUM	26364.900	MG/KG					
IR50	PA50SW501	MANGANESE	1025.200	MG/KG					
IR50	PA50SW501	MOLYBDENUM	3.450	MG/KG			>	2.68	
IR50	PA50SW501	NICKEL	226.730	MG/KG	>	20.90			
IR50	PA50SW501	POTASSIUM	2657.510	MG/KG					
IR50	PA50SW501	SILVER	1.260	MG/KG	>	1.00		1.43	
IR50	PA50SW501	SODIUM	21345.000	MG/KG					
IR50	PA50SW501	VANADIUM	64.480	MG/KG				117.17	
IR50	PA50SW501	ZINC	1010.190	MG/KG	>	150.00	>	109.86	*
IR50	PA50SW501	ALPHA-CHLORDANE	21.000	UG/KG					
IR50	PA50SW501	AROCLOR-1260	2700.000	UG/KG	>	22.70			
IR50	PA50SW501	GAMMA-CHLORDANE	16.000	UG/KG					
IR50	PA50SW501	BIS(2-ETHYLHEXYL)PHTHALATE	6500.000	UG/KG					
IR50	PA50SW501	CHRYSENE	730.000	UG/KG	>	384.00			
IR50	PA50SW501	FLUORANTHENE	1300.000	UG/KG	>	600.00			
IR50	PA50SW501	PYRENE	2000.000	UG/KG	>	668.00			
IR50	PA50SW501	CARBON DISULFIDE	27.150	UG/KG					
IR50	PA50SW501	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS	1300.000	MG/KG					
IR50	PA50SW501	PH	8.000	PH		><		><	
IR50	PA50SW501	TPH-DIESEL	1100.000	MG/KG					

APPENDIX B

COST OPINION DETAILS

ALTERNATIVE 1: OFF SITE DISPOSAL OF HAZARDOUS SEDIMENTS

STORM DRAIN SEDIMENTS
HUNTERS POINT SHIPYARD
COST ANALYSIS

Item/Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
CONSTRUCTION COSTS				
Equipment				
Mobilization/Demobilization				
Line Cleaning Equipment	1	lump sum	$3,000.00	$3,000
Rolloff Containers	4	each	$2,800.00	$11,200
Flatbed Truck	1	each	$345.00	$300
Front End Loader	1	each	$186.00	$200
Dump Truck	1	each	$186.00	$200
Baker Tanks	2	each	$360.00	$700
Compactor	1	each	$490.00	$500
Sediment Hauling and Placement				
Rolloff Container Lease (4)	4	months	$12,000.00	$48,000
Flatbed Truck	4	months	$1,225.00	$4,900
Front End Loader	4	months	$4,225.00	$16,900
Dump Truck	4	months	$4,075.00	$16,300
Setup/Remove Site Facilities (Note 1)	1	lump sum	$5,541.00	$5,500
Construct/Remove Stockpile Area	1	lump sum	$11,999.00	$12,000
Site Facilities (Notes 1,2)	4	months	$3,159.00	$12,600
Transfer Pump Rental (2)	4	months	$540.00	$2,200
Baker Tank Lease (2)	4	months	$1,110.00	$4,400
Health and Safety Equipment	4	months	$1,877.50	$7,500
Pickup Truck Rental (2)	4	months	$1,200.00	$4,800
Sediment/Wastewater Sampling	1	lump sum	$400.00	$400
			Subtotal	$151,600
Labor				
Setup/Remove Site Facilities (Note 1)	1	lump sum	$638.00	$600
Construct/Remove Stockpile Area (Note 3)	1	lump sum	$13,754.00	$13,800
Install/RemoveTransfer Pumps	2	each	$237.12	$500
Line Cleaning	99,500	linear feet	$1.00	$99,500
Heavy Duty Line Cleaning (Note 4)	1,100	cubic yards	$250.00	$275,000
Manhole Cleaning	254	each	$76.00	$19,300
Catchbasin Cleaning	524	each	$80.00	$41,900
Unfreezing Manholes (Note 5)	25	each	$158.08	$4,000
Video Monitoring (I)	99,500	linear feet	$0.60	$59,700
Video Monitoring (II)	99,500	linear feet	$0.60	$59,700
Sediment Hauling and Placement -- On Site (Note 6)	16	weeks	$3,645.18	$58,300
Sanitary Sewer Hookup	1	each	$1,316.00	$1,300
Sediment Sampling	50	each	$19.76	$1,000
Wastewater Sampling	10	each	$9.88	$100
			Subtotal	$634,700
Materials				
Setup Site Facilities (Note 1)	1	lump sum	$500.00	$500
Construct Stockpile Area (Note 3)	1	lump sum	$13,124.00	$13,100
PPE	1	lump sum	$3,200.00	$3,200
Sediment Hauling and Placement -- On Site (Notes 6, 7)	1	lump sum	$29,791.00	$29,800
Hazardous Sediment Transport Fee (Notes 8,9)	891	tons	$30.00	$26,700
Hazardous Sediment Stabilization/Disposal Fee (Notes 9,10	891	tons	$227.50	$202,700
Hazardous Sediment Transport Fee (Notes 8,9)	594	tons	$150.00	$89,100
Hazardous Sediment Treatment/Disposal Fee (Note 9,11)	594	tons	$600.00	$356,400
			Subtotal	$721,500

ALTERNATIVE 1: OFF SITE DISPOSAL OF HAZARDOUS SEDIMENTS

STORM DRAIN SEDIMENTS
HUNTERS POINT SHIPYARD
COST ANALYSIS

Item/Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
Analytical				
Sediment Analysis (Notes 12,13)				
Paint Filter samples	160	each	$10.00	$1,600
VOC samples	50	each	$274.50	$13,700
SVOC samples	50	each	$519.00	$26,000
Pesticide/PCB samples	50	each	$264.00	$13,200
Metals samples	50	each	$292.50	$14,600
TCLP samples	25	each	$151.50	$3,800
WET samples	25	each	$94.50	$2,400
Wastewater Analysis (Notes 13,14)				
VOC samples	10	each	$280.50	$2,800
SVOC samples	10	each	$529.50	$5,300
Pesticide/PCB samples	10	each	$264.00	$2,600
Metals samples	10	each	$289.50	$2,900
TPH (purgeable) samples	10	each	$123.00	$1,200
TPH (extractable) samples	10	each	$130.50	$1,300
General Water Quality samples	10	each	$51.00	$500
			Subtotal	$91,900
	TOTAL CONSTRUCTION COSTS			$1,599,700

Overhead and Profit at 20%	$319,900
Contingency at 30%	$479,900
	$799,800
TOTAL CAPITAL AND CONSTRUCTION COSTS	$2,399,500
TOTAL ALTERNATIVE COST	$2,399,500

ASSUMPTIONS

GENERAL

Cost assumes that 50 percent of all sediments generated will be hazardous. Of the hazardous sediments, 40 percent will require treatment to meet land ban restrictions for VOCs, and 60 percent will require stabilization to meet land ban restrictions for metals.

Nonhazardous sediments will be stockpiled for later use in construction of the Parcel E landfill.

Sediments will be stockpiled daily to await analytical results.

The existing decontamination pad at Hunters Point will be used.

NOTE 1 Site facilities include personnel and equipment decontamination stations, office trailer, storage van, and toilets.

NOTE 2 Equipment costs include rental of decon. trailer, baker tank, steam cleaner, pump, office trailer, storage van, and toilets.

NOTE 3 The stockpile area will consist of a 150 foot by 200 foot square liner overlain by 1 foot of compacted soils.

NOTE 4 All sediments in manholes and catchbasins will require heavy duty cleaning and half the sediments in drain lines will require heavy duty cleaning

NOTE 5 Assumes 2 laborers will be required for 4 hours to unfreeze each stuck manhole.

NOTE 6 Assumes 1 full-time and 1 part-time laborer and 1 full-time and 1 part-time heavy equipment operator will be employed for the duration of construction activities. Includes labor for setting temporary liners for daily stockpiles.

NOTE 7 Daily sediment stockpiles will be placed on temporary 40 foot by 40 foot liners. The liners will be removed and disposed with each sediment stockpile.

NOTE 8 All hazardous sediment transport will be conducted by the disposal facility.

NOTE 9 Assumes sediment density of 110 pounds per cubic foot.

NOTE 10 Unit cost for stabilization and disposal at the Kettleman Hills Class I landfill in California.

NOTE 11 Unit cost for treatment and disposal at the Laidlaw Class I landfill in Clive, Utah.

NOTE 12 Sediments will be sampled every 50 cubic yards.

NOTE 13 Analytical costs assume 50 percent increase for 5 day turnaround.

NOTE 14 Wastewater sampling frequency assumes that each full baker tank is sampled before discharge to sanitary sewer.

ALTERNATIVE 2: OFF SITE DISPOSAL OF ALL SEDIMENTS

STORM DRAIN SEDIMENTS
HUNTERS POINT SHIPYARD
COST ANALYSIS

Item/Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
CONSTRUCTION COSTS				
Equipment				
Mobilization/Demobilization				
Line Cleaning Equipment	1	lump sum	$3,000.00	$3,000
Rolloff Containers	4	each	$2,800.00	$11,200
Flatbed Truck	1	each	$345.00	$300
Front End Loader	1	each	$186.00	$200
Dump Truck	1	each	$186.00	$200
Baker Tanks	2	each	$360.00	$700
Compactor	1	each	$490.00	$500
Sediment Hauling and Placement				
Rolloff Container Lease (4)	4	months	$12,000.00	$48,000
Flatbed Truck	4	months	$1,225.00	$4,900
Front End Loader	4	months	$4,225.00	$16,900
Setup/Remove Site Facilities (Note 1)	1	lump sum	$5,541.00	$5,500
Construct/Remove Stockpile Area	1	lump sum	$11,999.00	$12,000
Site Facilities (Notes 1,2)	4	months	$3,159.00	$12,600
Transfer Pump Rental (2)	4	months	$540.00	$2,200
Baker Tank Lease (2)	4	months	$1,110.00	$4,400
Health and Safety Equipment	4	months	$1,877.50	$7,500
Pickup Truck Rental (2)	4	months	$1,200.00	$4,800
Sediment/Wastewater Sampling	1	lump sum	$400.00	$400
			Subtotal	$135,300
Labor				
Setup/Remove Site Facilities (Note 1)	1	lump sum	$638.00	$600
Construct/Remove Stockpile Area (Note 3)	1	lump sum	$13,754.00	$13,800
Install/RemoveTransfer Pumps	2	each	$237.12	$500
Line Cleaning	99,500	linear feet	$1.00	$99,500
Heavy Duty Line Cleaning (Note 4)	1,100	cubic yards	$250.00	$275,000
Manhole Cleaning	254	each	$76.00	$19,300
Catchbasin Cleaning	524	each	$80.00	$41,900
Unfreezing Manholes (Note 5)	25	each	$158.08	$4,000
Video Monitoring (I)	99,500	linear feet	$0.60	$59,700
Video Monitoring (II)	99,500	linear feet	$0.60	$59,700
Sediment Hauling and Placement -- On Site (Note 6)	16	weeks	$3,088.78	$49,400
Sanitary Sewer Hookup	1	each	$1,316.00	$1,300
Sediment Sampling	50	each	$19.76	$1,000
Wastewater Sampling	10	each	$9.88	$100
			Subtotal	$625,800
Materials				
Setup Site Facilities (Note 1)	1	lump sum	$500.00	$500
Construct Stockpile Area (Note 3)	1	lump sum	$13,124.00	$13,100
PPE	1	lump sum	$3,200.00	$3,200
Sediment Hauling and Placement -- On Site (Notes 6, 7)	1	lump sum	$29,791.00	$29,800
Nonhazardous Sediment Transport Fee (Notes 8,9)	1,485	tons	$11.00	$16,300
Nonhazardous Sediment Disposal Fee (Notes 9,10)	1,485	tons	$38.00	$56,400
Hazardous Sediment Transport Fee (Notes 8,9)	891	tons	$30.00	$26,700
Hazardous Sediment Stabilization/Disposal Fee (Notes 9,1	891	tons	$227.50	$202,700
Hazardous Sediment Transport Fee (Notes 8,9)	594	tons	$150.00	$89,100
Hazardous Sediment Treatment/Disposal Fee (Notes 9,12)	594	tons	$600.00	$356,400
			Subtotal	$794,200

ALTERNATIVE 2: OFF SITE DISPOSAL OF ALL SEDIMENTS

STORM DRAIN SEDIMENTS
HUNTERS POINT SHIPYARD
COST ANALYSIS

Item/Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
Analytical				
Sediment Analysis (Notes 13,14)				
Paint Filter samples	160	each	$10.00	$1,600
VOC samples	50	each	$274.50	$13,700
SVOC samples	50	each	$519.00	$26,000
Pesticide/PCB samples	50	each	$264.00	$13,200
Metals samples	50	each	$292.50	$14,600
TCLP samples	25	each	$151.50	$3,800
WET samples	25	each	$94.50	$2,400
Wastewater Analysis (Notes 14,15)				
VOC samples	10	each	$280.50	$2,800
SVOC samples	10	each	$529.50	$5,300
Pesticide/PCB samples	10	each	$264.00	$2,600
Metals samples	10	each	$289.50	$2,900
TPH (purgeable) samples	10	each	$123.00	$1,200
TPH (extractable) samples	10	each	$130.50	$1,300
General Water Quality samples	10	each	$51.00	$500
			Subtotal	$91,900
	TOTAL CONSTRUCTION COSTS			$1,647,200
Overhead and Profit at 20%				$329,400
Contingency at 30%				$494,200
				$823,600
TOTAL CAPITAL AND CONSTRUCTION COSTS				$2,470,800
TOTAL ALTERNATIVE COST				$2,470,800

ASSUMPTIONS

GENERAL

Cost assumes that 50 percent of all sediments generated will be hazardous. Of the hazardous sediments, 40 percent will require treatment to meet land ban restrictions for VOCs, and 60 percent will require stabilization to meet land ban restrictions for metals.

Nonhazardous sediments will be disposed off site in a Class III landfill.

Sediments will be stockpiled daily to await analytical results.

The existing decontamination pad at Hunters Point will be used.

NOTE 1 Site facilities include personnel and equipment decontamination stations, office trailer, storage van, and toilets.

NOTE 2 Equipment costs include rental of decon. trailer, baker tank, steam cleaner, pump, office trailer, storage van, and toilets.

NOTE 3 The stockpile area will consist of a 150 foot by 200 foot square liner overlain by 1 foot of compacted soils.

NOTE 4 All sediments in manholes and catchbasins will require heavy duty cleaning and half the sediments in drain lines will require heavy duty cleaning

NOTE 5 Assumes 2 laborers will be required for 4 hours to unfreeze each stuck manhole.

NOTE 6 Assumes 1 full-time and 1 part-time laborer and 1 full-time heavy equipment operator will be employed for the duration of construction activities. Includes labor for setting temporary liners for daily stockpiles.

NOTE 7 Daily sediment stockpiles will be placed on temporary 40 foot by 40 foot liners. The liners will be removed and disposed with each sediment stockpile.

NOTE 8 All sediment transport will be conducted by the respective disposal facility.

NOTE 9 Assumes sediment density of 110 pounds per cubic foot.

NOTE 10 Unit cost for disposal at the Kettleman Hills Class III landfill in California.

NOTE 11 Unit cost for stabilization and disposal at the Kettleman Hills Class I landfill in California.

NOTE 12 Unit cost for treatment and disposal at the Laidlaw Class I landfill in Clive, Utah.

NOTE 13 Sediments will be sampled every 50 cubic yards.

NOTE 14 Analytical costs assume 50 percent increase for 5 day turnaround.

NOTE 15 Wastewater sampling frequency assumes that each full baker tank is sampled before discharge to sanitary sewer.

ALTERNATIVE 3: ON-SITE MANAGEMENT

STORM DRAIN SEDIMENTS
HUNTERS POINT SHIPYARD
COST ANALYSIS

Item/Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
CONSTRUCTION COSTS				
Equipment				
Mobilization/Demobilization				
Line Cleaning Equipment	1	lump sum	$3,000.00	$3,000
Rolloff Containers	4	each	$2,800.00	$11,200
Flatbed Truck	1	each	$345.00	$300
Front End Loader	1	each	$186.00	$200
Dump Truck	1	each	$186.00	$200
Dozer	1	each	$195.00	$200
Baker Tanks	2	each	$360.00	$700
Compactor	1	each	$490.00	$500
Drill Rig	1	each	$2,000.00	$2,000
Well Development Rig	1	each	$600.00	$600
Sediment Hauling and Placement				
Rolloff Container Lease (4)	4	months	$12,000.00	$48,000
Flatbed Truck	4	months	$1,225.00	$4,900
Front End Loader	4	months	$4,225.00	$16,900
Dump Truck	4	months	$4,075.00	$16,300
Dozer	1	months	$9,275.00	$9,300
Landfill Construction (Note 1)				
Excavation	1,200	cubic yards	$0.41	$500
Sand (Haul and Place)	800	cubic yards	$5.61	$4,500
Soil (Place and Compact)	1200	cubic yards	$0.70	$800
Vegetation	11	msf	$7.15	$100
Setup/Remove Site Facilities (Note 2)	1	lump sum	$5,541.00	$5,500
Construct/Remove Stockpile Area	1	lump sum	$11,999.00	$12,000
Site Facilities (Notes 2,3)	4	months	$3,159.00	$12,600
Transfer Pump Rental (2)	4	months	$540.00	$2,200
Baker Tank Lease (2)	4	months	$1,110.00	$4,400
Health and Safety Equipment	4	months	$1,877.50	$7,500
Pickup Truck Rental (2)	4	months	$1,200.00	$4,800
Sediment/Wastewater Sampling	1	lump sum	$400.00	$400
Monitoring Well Installation	60	linear feet	$10.42	$600
			Subtotal	$170,200
Labor				
Setup/Remove Site Facilities (Note 2)	1	lump sum	$638.00	$600
Construct/Remove Stockpile Area (Note 4)	1	lump sum	$13,754.00	$13,800
Install/RemoveTransfer Pumps	2	each	$237.12	$500
Line Cleaning	99,500	linear feet	$1.00	$99,500
Heavy Duty Line Cleaning (Note 5)	1,100	cubic yards	$250.00	$275,000
Manhole Cleaning	254	each	$76.00	$19,300
Catchbasin Cleaning	524	each	$80.00	$41,900
Unfreezing Manholes (Note 6)	25	each	$158.08	$4,000
Video Monitoring (I)	99,500	linear feet	$0.60	$59,700
Video Monitoring (II)	99,500	linear feet	$0.60	$59,700
Sediment Hauling and Placement -- On Site (Note 7)	16	weeks	$9,983.95	$159,700
Landfill Construction				
Excavation	1,200	cubic yards	$0.25	$300
Sand (Haul and Place)	800	cubic yards	$2.14	$1,700
Soil (Place and Compact)	1,200	cubic yards	$0.68	$800
Liner	21,600	square feet	$0.08	$1,700
Vegetation	11	msf	$6.50	$100
Sanitary Sewer Hookup	1	each	$1,316.00	$1,300
Monitoring Well Installation (Note 8)				
Boring	60	linear feet	$25.00	$1,500
Construction	60	linear feet	$13.00	$800
Completion	3	each	$125.00	$400
Development	3	each	$65.00	$200
Survey	3	each	$270.00	$800
Subsurface Utility Clearance	12	hours	$120.00	$1,400
Drums for Handling Cuttings	9	each	$25.00	$200
Decontamination	3	each	$37.50	$100
CAMU Administration (Note 9)	2	months	$8,300.00	$16,600
Sediment Sampling	50	each	$19.76	$1,000
Wastewater Sampling	10	each	$9.88	$100
			Subtotal	$762,700

ALTERNATIVE 3: ON-SITE MANAGEMENT

STORM DRAIN SEDIMENTS
HUNTERS POINT SHIPYARD
COST ANALYSIS

	Item/Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
Materials					
	Setup Site Facilities (Note 2)	1	lump sum	$500.00	$500
	Construct Stockpile Area (Note 4)	1	lump sum	$13,124.00	$13,100
	PPE	1	lump sum	$3,200.00	$3,200
	Landfill Construction (Note 1)				
	Sand	800	cubic yards	$10.00	$8,000
	HDPE Liner	21,600	square feet	$0.27	$5,800
	Vegetation	11	msf	$18.25	$200
	Sediment Hauling and Placement -- On Site (Note 10)	1	lump sum	$29,791.00	$29,800
	Monitoring Well Installation (Note 8)				
	2-inch PVC Casing	60	linear feet	$6.00	$400
	2-inch PVC Screen	30	linear feet	$8.00	$200
	Steel Casing	3	each	$150.00	$500
	Miscellaneous Well Materials	3	each	$118.00	$400
	Drums for Handling Cuttings	9	each	$60.00	$500
				Subtotal	$62,600
Analytical					
	Sediment Analysis (Notes 11,12)				
	Paint Filter samples	160	each	$10.00	$1,600
	VOC samples	50	each	$274.50	$13,700
	SVOC samples	50	each	$519.00	$26,000
	Pesticide/PCB samples	50	each	$264.00	$13,200
	Metals samples	50	each	$292.50	$14,600
	TCLP samples	25	each	$151.50	$3,800
	WET samples	25	each	$94.50	$2,400
	Wastewater Analysis (Notes 12,13)				
	VOC samples	10	each	$280.50	$2,800
	SVOC samples	10	each	$529.50	$5,300
	Pesticide/PCB samples	10	each	$264.00	$2,600
	Metals samples	10	each	$289.50	$2,900
	TPH (purgeable) samples	10	each	$123.00	$1,200
	TPH (extractable) samples	10	each	$130.50	$1,300
	General Water Quality samples	10	each	$51.00	$500
				Subtotal	$91,900
		TOTAL CONSTRUCTION COSTS			$1,087,400
Overhead and Profit at 20%					$217,500
Contingency at 30%					$326,200
					$543,700
TOTAL CAPITAL AND CONSTRUCTION COSTS					$1,631,100

ALTERNATIVE 3: ON-SITE MANAGEMENT

STORM DRAIN SEDIMENTS
HUNTERS POINT SHIPYARD
COST ANALYSIS

Item/Description		Quantity	Unit	Unit Cost ($)	Total Cost ($)
ANNUAL OPERATION AND MAINTENANCE COST					
Equipment					
	Quarterly Sampling (Note 14)	1	lump	$800.00	$800
				Subtotal	$800
Labor					
	Quarterly Sampling (Note 15)	1	lump	$3,200.00	$3,200
				Subtotal	$3,200
Materials	(15% of Well Construction Costs)			**Subtotal**	$1,600
Analytical					
	Quarterly Sampling (Note 16)				
	VOC samples	12	each	$280.50	$3,400
	SVOC samples	12	each	$529.50	$6,400
	Pesticide/PCB samples	12	each	$264.00	$3,200
	Metals samples	12	each	$289.50	$3,500
	TPH (purgeable) samples	12	each	$123.00	$1,500
	TPH (extractable) samples	12	each	$130.50	$1,600
				Subtotal	$19,600
		ANNUAL O&M COSTS			$25,200
Overhead and Profit at 20%					$5,000
Contingency at 30%					$7,600
					$12,600
TOTAL ANNUAL O&M COSTS					$37,800
LIFETIME OPERATION AND MAINTENANCE COST					
	Discount Rate	4	%		
	Years	5			
		LIFETIME O&M COSTS			$168,300
TOTAL ALTERNATIVE COST					$1,799,400

ASSUMPTIONS

GENERAL

Cost assumes groundwater monitoring will be conducted for a period of 5 years after construction of the disposal cell.
At that time, the HPA landfill will be capped and monitoring will no longer be conducted under this EE/CA.
The existing decontamination pad at Hunters Point will be used.

NOTE 1 The on-site disposal cell base will consist of 1 foot of soil overlaying a 20 mil-thich HDPE liner placed on 6 inches of sand. The landfill cap will consist of 6 inches of sand, a 20 mil-thick HDPE liner, 1 foot of sand, and 2 feet of soil. The top of the landfill will be vegetated with grass.
NOTE 2 Site facilities include personnel and equipment decontamination stations, office trailer, storage van, and toilets.
NOTE 3 Equipment costs include rental of decon. trailer, baker tank, steam cleaner, pump, office trailer, storage van, and toilets.
NOTE 4 The stockpile area will consist of a 150 foot by 200 foot square liner overlain by 1 foot of compacted soils.
NOTE 5 All sediments in manholes and catchbasins will require heavy duty cleaning and half the sediments in drain lines will require heavy duty cleaning
NOTE 6 Assumes 2 laborers will be required for 4 hours to unfreeze each stuck manhole.
NOTE 7 Assumes 2 full-time laborers and heavy equipment operators and 1 part time equipment operator will be employed for the duration of construction activities. Includes labor for setting temporary liners for daily stockpiles.
NOTE 8 Three 20-foot deep monitoring wells will be constructed to monitor groundwater qulaity in the vicinity of the disposal cell.
NOTE 9 Assumes 2 personnel will be required full-time for 2 months for administrative issues related to implementation of a CAMU.
NOTE 10 Daily sediment stockpiles will be placed on temporary 40 foot by 40 foot liners. The liners will be removed and disposed with each sediment stockpile.
NOTE 11 Sediments will be sampled every 50 cubic yards.
NOTE 12 Analytical costs assume 50 percent increase for 5 day turnaround.
NOTE 13 Wastewater sampling frequency assumes that each full baker tank is sampled before discharge to sanitary sewer.
NOTE 14 Includes vehicle and equipment rental.
NOTE 15 Quarterly sampling will take 1 day/quarter with 2 personnel. Includes salary, lodging, and meals.
NOTE 16 Quarterly sampling will require 1 sample from each of 3 wells 4 times a year.

ALTERNATIVE 4: ON-SITE TREATMENT

STORM DRAIN SEDIMENTS
HUNTERS POINT SHIPYARD
COST ANALYSIS

Item/Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
CONSTRUCTION COSTS				
Equipment				
Mobilization/Demobilization				
Line Cleaning Equipment	1	lump sum	$3,000.00	$3,000
Rolloff Containers	4	each	$2,800.00	$11,200
Flatbed Truck	1	each	$345.00	$300
Front End Loader	1	each	$186.00	$200
Dump Truck	1	each	$186.00	$200
Baker Tanks	2	each	$360.00	$700
Compactor	1	each	$490.00	$500
Stabilization Equipment	1	lump sum	$16,800.00	$16,800
Sediment Hauling and Placement				
Rolloff Container Lease (4)	4	months	$12,000.00	$48,000
Flatbed Truck	4	months	$1,225.00	$4,900
Front End Loader	4	months	$4,225.00	$16,900
Dump Truck	4	months	$4,075.00	$16,300
Setup/Remove Site Facilities (Note 1)	1	lump sum	$5,541.00	$5,500
Construct/Remove Stockpile Area	1	lump sum	$11,999.00	$12,000
Site Facilities (Notes 1,2)	4	months	$3,159.00	$12,600
Transfer Pump Rental (2)	4	months	$540.00	$2,200
Baker Tank Lease (2)	4	months	$1,110.00	$4,400
Health and Safety Equipment	4	months	$1,877.50	$7,500
Pickup Truck Rental (2)	4	months	$1,200.00	$4,800
Sediment/Wastewater Sampling	1	lump sum	$400.00	$400
			Subtotal	$168,400
Labor				
Setup/Remove Site Facilities (Note 1)	1	lump sum	$638.00	$600
Construct/Remove Stockpile Area (Note 3)	1	lump sum	$13,754.00	$13,800
Install/RemoveTransfer Pumps	2	each	$237.12	$500
Line Cleaning	99,500	linear feet	$1.00	$99,500
Heavy Duty Line Cleaning (Note 4)	1,100	cubic yards	$250.00	$275,000
Manhole Cleaning	254	each	$76.00	$19,300
Catchbasin Cleaning	524	each	$80.00	$41,900
Unfreezing Manholes (Note 5)	25	each	$158.08	$4,000
Video Monitoring (I)	99,500	linear feet	$0.60	$59,700
Video Monitoring (II)	99,500	linear feet	$0.60	$59,700
Sediment Hauling and Placement -- On Site (Note 6)	16	weeks	$9,983.95	$159,700
Sanitary Sewer Hookup	1	each	$1,316.00	$1,300
Sediment Sampling	50	each	$19.76	$1,000
Wastewater Sampling	10	each	$9.88	$100
			Subtotal	$736,100
Materials				
Setup Site Facilities (Note 1)	1	lump sum	$500.00	$500
Construct Stockpile Area (Note 3)	1	lump sum	$13,124.00	$13,100
PPE	1	lump sum	$3,200.00	$3,200
Sediment Hauling and Placement -- On Site (Notes 6, 7)	1	lump sum	$29,791.00	$29,800
Stabilization (Note 8)	891	tons	$60.00	$53,500
Stabilized Sediment Transport Fee (Notes 9,10,11)	1,158	tons	$11.00	$12,700
Stabilized Sediment Disposal Fee (Notes 9,11,12)	1,158	tons	$38.00	$44,000
Nonhazardous Sediment Transport Fee (Note 10,11)	1,485	tons	$11.00	$16,300
Nonhaz. Sediment Treatment/Disposal Fee (Notes 11,12)	1,485	tons	$38.00	$56,400
Hazardous Sediment Transport Fee (Notes 10,11)	594	tons	$150.00	$89,100
Hazardous Sediment Treatment/Disposal Fee (Note 11,13)	594	tons	$600.00	$356,400
			Subtotal	$675,000

ALTERNATIVE 4: ON-SITE TREATMENT

STORM DRAIN SEDIMENTS
HUNTERS POINT SHIPYARD
COST ANALYSIS

Item/Description	Quantity	Unit	Unit Cost ($)	Total Cost ($)
Analytical				
Sediment Analysis (Notes 14,15)				
Paint Filter samples	160	each	$10.00	$1,600
VOC samples	50	each	$274.50	$13,700
SVOC samples	50	each	$519.00	$26,000
Pesticide/PCB samples	50	each	$264.00	$13,200
Metals samples	50	each	$292.50	$14,600
TCLP samples (Note 16)	41	each	$151.50	$6,200
WET samples	41	each	$94.50	$3,900
Wastewater Analysis (Notes 15,17)				
VOC samples	10	each	$280.50	$2,800
SVOC samples	10	each	$529.50	$5,300
Pesticide/PCB samples	10	each	$264.00	$2,600
Metals samples	10	each	$289.50	$2,900
TPH (purgeable) samples	10	each	$123.00	$1,200
TPH (extractable) samples	10	each	$130.50	$1,300
General Water Quality samples	10	each	$51.00	$500
			Subtotal	$95,800
	TOTAL CONSTRUCTION COSTS			$1,675,300
Overhead and Profit at 20%				$335,100
Contingency at 30%				$502,600
				$837,700
TOTAL CAPITAL AND CONSTRUCTION COSTS				$2,513,000
TOTAL ALTERNATIVE COST				$2,513,000

ASSUMPTIONS

GENERAL

Cost assumes that 50 percent of all sediments generated will be hazardous. Of the hazardous sediments, 40 percent will require treatment to meet land ban restrictions for VOCs, and 60 percent require stabilization to meet land ban restrictions for metals. Sediments requiring treatment will be sent off site to a Class I treatment and disposal facility. Sediments requiring stabilization only will be treated on site and disposed of off site at a Class III landfill.

Nonhazardous sediments will be disposed of at a Class III landfill.

Sediments will be stockpiled daily to await analytical results.

The existing decontamination pad at Hunters Point will be used.

NOTE 1 Site facilities include personnel and equipment decontamination stations, office trailer, storage van, and toilets.

NOTE 2 Equipment costs include rental of decon. trailer, baker tank, steam cleaner, pump, office trailer, storage van, and toilets.

NOTE 3 The stockpile area will consist of a 150 foot by 200 foot square liner overlain by 1 foot of compacted soils.

NOTE 4 All sediments in manholes and catchbasins will require heavy duty cleaning and half the sediments in drain lines will require heavy duty cleaning

NOTE 5 Assumes 2 laborers will be required for 4 hours to unfreeze each stuck manhole.

NOTE 6 Assumes 2 full-time laborers and heavy equipment operators and 1 part time equipment operator will be employed for the duration of construction activities. Includes labor for setting temporary liners for daily stockpiles.

NOTE 7 Daily sediment stockpiles will be placed on temporary 40 foot by 40 foot liners. The liners will be removed and disposed with each sediment stockpile.

NOTE 8 Sediment stabilization unit costs taken from IT comments to draft EE/CA.

NOTE 9 Assumes 30 percent sediment weight increase due to stabilization

NOTE 10 All nonhazardous, stabilized, and hazardous sediment off-site transport will be conducted by the disposal facility.

NOTE 11 Assumes sediment density of 110 pounds per cubic foot.

NOTE 12 Unit cost for disposal at the Kettleman Hills Class III landfill in California.

NOTE 13 Unit cost for treatment and disposal at the Laidlaw Class I landfill in Clive, Utah.

NOTE 14 Sediments will be sampled every 50 cubic yards.

NOTE 15 Analytical costs assume 50 percent increase for 5 day turnaround.

NOTE 16 TCLP and WET analysis will be conducted on sediments as generated and also on stabilized sediments.

NOTE 17 Wastewater sampling frequency assumes that each full baker tank is sampled before discharge to sanitary sewer.

APPENDIX C

RESPONSE TO COMMENTS

RESPONSE TO AGENCY COMMENTS ON DRAFT ENGINEERING EVALUATION/COST ANALYSIS FOR HUNTERS POINT ANNEX SHIPYARD STORM DRAIN SYSTEM

This document presents the Navy's responses to comments on the draft engineering evaluation/cost analysis (EE/CA) for the Storm Drain System, Hunters Point Shipyard (HPS), dated April 5, 1996. The comments addressed below were received from the U.S. Environmental Protection Agency (EPA) on May 6, 1996 and California Department of Toxic Substances Control (DTSC) on May 8, 1996. The responses to comments have been further revised based on verbal discussions with the regulatory agencies on the Navy's responses to comments presented in the draft final EE/CA. The revised responses follow.

RESPONSE TO COMMENTS FROM EPA

General Comments

1. Comment: **The use of "selection levels" as screening criteria for specified metals is unacceptable. There has been no discussion regarding the designation and use of such levels between members of the BCT. The EE/CA contains no justification or explanation of methods used to calculate the levels which are sometimes 300 to 400 times the screening criteria in Table 6. The agencies and the Navy must first come to an agreement on the appropriateness of the need to determine such selection levels and on a method to calculate the levels, and then all decisions and agreements should be fully explained in the EE/CA.**

   Response: In a meeting held on May 7, 1996, EPA, DTSC, the Regional Water Quality Control Board (RWQCB), and the Navy discussed the screening approach presented in the draft EE/CA for groundwater infiltrating into the storm drain system. No acceptable screening approach for infiltrating groundwater was identified. Instead, all attendees agreed to narrow the scope of the storm drain action to encompass removal of sediment only. Therefore, no screening criteria for groundwater will be used in this EE/CA. It was further agreed that the Navy would, outside of the removal action process, establish background levels of inorganic constituents in groundwater and evaluate the threat that might be posed by groundwater infiltrating into the storm drain system.

   The process of identifying and using groundwater screening criteria for HPS which are acceptable to the Navy and the regulating agencies is not yet complete. Outstanding issues to be resolved as part of this effort include the (1) selection of a group or combination of groups of risk numbers which can be used for screening criteria and (2) consideration of groundwater ambient levels. Currently, the Navy is working with the agencies on a separate study to identify Hunters Point Groundwater Ambient Levels (HGALs). Selection of appropriate screening criteria and use of HGALs will be conducted within the Draft Final Parcel B Feasibility Study (FS) since that document will contain the first proposed remedial action for groundwater at HPS. If more time is needed to resolve the screening criteria and HGALs issues than is allowed by the FS schedule, the Record of Decision (ROD) will include as a condition, a description of the process to be used. Final screening levels would then be identified in the remedial design phase for Parcel B.

2. Comment: **Since all reaches of the storm drain system have been screened out for metals in this EE/CA by using the selection levels discussed above, these reaches will probably need to be re-evaluated after mutually agreed upon screening levels for metals are determined.**

Response: Comment noted. Please see the response to general comment 1 regarding further evaluation of background levels for metals. Infiltration study sampling will be performed at the completion of sediment cleaning. Sampling data from the infiltration study will be used in the parcel FSs or will be the basis of a requirement for a conditional ROD in parcels where an FS has already been completed.

3. Comment: **The document as it stands uses only PCBs [polychlorinated biphenyls] as the trigger for monitoring groundwater infiltration into storm drains, and then only one reach (although PCBs were detected in two reaches - see Specific Comment #35), and as such barely supports the need for a removal action related to groundwater contamination. Since organics (TCE, DCE [trichloroethene, dichloroethene]) were detected above Bay and Estuary screening criteria, it would be useful to sample and analyze for these constituents in addition to metals, pesticides, and PCBs.**

Response: Monitoring for PCBs in two reaches should have been presented. Bay and estuary plan water quality objectives were not used as screening criteria in this EE/CA. Water quality was compared, however, with bay and estuary plan water quality objectives for informational purposes. This is stated in the last paragraph on page 38 and in the first sentence beginning on page 45.

The infiltration of groundwater into the storm drain system has been removed from the scope of the removal action, but sampling for the infiltration study will be performed at the completion of sediment removal work. Sampling data from the infiltration study will be used in the parcel FSs or will be the basis of a requirement for a conditional ROD in parcels where an FS has already been completed. Please refer to the response to EPA general comment 1 for further explanation.

4. Comment: **Much discussion is presented on whether the soil and sediments in the catch basins are considered solid waste, and possibly hazardous waste, and which ARARs [applicable or relevant and appropriate requirements] would and should not apply. Because the materials in the storm drains are going to be removed and disposed of, they are classified as solid waste. In order to be treated and/or disposed of, it will be necessary to characterize this waste, at which point it can be characteristically hazardous. Therefore, much of the text (see Specific Comments #15, #24, and #27 below) can be deleted, making the document more succinct.**

Response: The purpose of this discussion is to provide a general overview of the hazardous waste requirements that would apply to either on-site or off-site management of storm drain sediments. The discussion in Section 4.3.2.3 has been modified to explain the general requirements for hazardous waste identification while also describing the Navy's strategy to minimize the total volume of sediment requiring treatment or disposal as hazardous waste.

Soil, groundwater, sediment, and other environmental media are not considered wastes in and of themselves, but they may contain listed hazardous wastes or exhibit a characteristic of hazardous waste (EPA 1988, 1989; Wehling 1994). If managed on-site, environmental media containing a listed waste or exhibiting a characteristic of hazardous waste must be managed according to applicable hazardous waste regulations until the listed waste or characteristic is removed from the environmental media. For off-site management, environmental media containing a listed waste or exhibiting a characteristic of hazardous waste must be managed consistently with other types of hazardous waste. The discussion in Section 4.3.2.3 has been modified accordingly.

5. **Comment:** **The confusion that exists over the purpose of screening criteria is reflected throughout the EE/CA. Screening levels are used to indicate which contaminants present a concern and a possible risk to receptors. The goal of the removal action is not to prevent all contaminants above screening levels from reaching the Bay. Contaminants of concern will be considered on a case by case basis and some will need to be prevented from getting to the Bay. Removal actions are designed to be in line with the final remedy chosen for a site, and as such should look at all possible contaminants for screening purposes to obviate the need to go back at a later date and redo work that could easily have been performed under the removal action.**

Response: The Navy agrees with the stated description of the use of screening criteria and has used the results of the screening presented in the EE/CA along with other factors to identify contaminants and areas of concern. Please refer to the response to EPA general comment 1 for further discussion concerning groundwater screening criteria.

6. **Comment:** **The document states that when considering the off-site disposal alternative, LDRs [land disposal restrictions] for metals may require stabilization. The unit disposal cost does not reflect this possibility. Please discuss the likelihood of the need for stabilization. The estimated unit cost for stabilization would allow a more accurate comparison of alternatives.**

Response: The unit cost provided for off-site disposal at a Class I landfill is based on a quote from a Class I landfill (Kettleman Hills) and reflects stabilization at the facility. The unit cost for off-site disposal at a Class III landfill is also based on a quote, and does not reflect stabilization since it is assumed that no materials exceeding LDR levels will be sent to a Class III landfill. All sediments exceeding LDRs for metals will be stabilized, and all sediments exceeding LDRs for organic compounds will be thermally treated (or equivalent) and stabilized (if necessary) by the Class I Landfill.

7. Comment: **The method used for comparative analysis of remedial alternatives (see Table 8, pg 75) contains eight separate categories ranked on a scale of 1 to 5. Please explain whether each of the eight categories have equal importance in evaluating the remedial alternatives.**

The rankings in some of the categories are more subjective than others. Placing a numerical score can be difficult and inexact. The final rankings showed the two top scores within one point. Please discuss the advantages and disadvantages of relying on this system.

Response: For purposes of comparing the technologies, the ranking method used assumes that the eight categories are of equal importance in evaluating the remedial alternatives. The primary advantage of the ranking system is that it provides a means for defining areas of importance and applying relative degrees of quality for each remedial alternative. With the exception of cost, all the categories rankings are subjective and are based on knowledge and professional experience. Because requirements differ for all remedial and construction projects, it is difficult to use an absolute scale to rank the alternatives. The rankings that were provided were considered appropriate based on EE/CA authors' experience and in light of the uncertainty of sediment contamination and volume.

8. Comment: **This document does not adequately address the organic contaminants in the sediments that have LDRs. The alternatives address only metal contaminants which leads to landfilling as the best technology. The organic LDRs must be addressed; this may lead to other technologies being selected for those sediments with LDR chemicals.**

Response: The sediment data in Appendix B were compared with the universal treatment standards that are found in Title 40 Code of Federal Regulations (CFR) Part 268.48. Based on this analysis, the projected percentage of sediments that will be sent off-site for treatment of both organic and inorganic constituents followed by off-site disposal was estimated at 20 percent for the revised EE/CA cost opinion. On-site treatment for organic compounds is not considered a viable option because of the expected variability of sediment quality that will be encountered as this sediment is removed. Text discussing LDR restrictions of organic compounds has been added to Section 5.2.1.

Specific Comments

1. Comment: **Executive Summary, pg. ES-3, paragraph 32: Please define "reasonably low cost."**

Response: The phrase "reasonably low cost" has been changed to read "a cost similar to the other alternatives evaluated."

2. **Comment:** **Executive Summary, pg. ES-3, last paragraph: Where will the liquid portion of the accumulated sediment slurry be disposed, and what plans are there for characterization prior to disposal.**

Response: The following sentence has been added to the last paragraph of the executive summary: "Liquid removed from the sediment will be characterized before discharge to the local publicly owned treatment works (POTW). This water is expected to meet POTW pretreatment standards."

3. **Comment:** **Section 1, pg. 1, first paragraph: Please update to reflect current status of groundwater removal actions for Parcel E and delete the mention of Parcels B and C.**

Response: The following text has been added to the first paragraph of Section 1.0 Groundwater removal actions are no longer being pursued in Parcels B and C. Remediation of these parcels will be addressed as part of the remedial investigation and feasibility study (RI/FS) process. The groundwater removal action documentation at Site IR-1/21 in Parcel E is being completed concurrently with this project.

4. **Comment:** **Section 1, pg. 1, paragraph 3: In addition to the two pathways identified, there is another pathway which consists of the potential for the bedding material for the pipeline to act as a conduit for contaminated groundwater to follow. This path would channel contaminated groundwater to the Bay. To determine whether this pathway exists, the construction of the pipeline should be reviewed.**

Response: Storm drain lines may or may not be bedded in porous material. Experience at other bases such as Moffett Federal Airfield indicates that the bedding material may be native material. Additional investigation may be required to determine whether this pathway exists at HPS. Although not included in the scope of this removal action, the potential threat posed by contaminant migration through storm drain bedding material is currently being considered as part of a separate study associated with determination of HGALs.

5. **Comment:** **Section 2.3.5, pg. 10: Please discuss the soil types that surround the storm drains. For instance, discuss whether these drains are buried in native soil or whether they are in the fill zone.**

Response: The soil types were discussed in this section. Section 2.3.5 states that the soils at HPS are derived from underlying rocks and weathered material or imported as fill. The depth of this discussion was felt to be adequate for this EE/CA.

6. **Comment:** **Section 2.4.1, pg. 12, paragraph 1, first sentence: "by one estimate approximately 107,000 linear feet of storm drain line". Please clarify whether HLA 1994 is the source of this estimate. Other estimates should also be provided, since the statement implies that there are other estimates. Why was this particular one chosen?**

Two conflicting estimates of the numbers of catch basins are given. Which one is correct and why?

Response: The letter report cited as HLA 1994 is the source of this estimate. This estimate was chosen since it is the only one quantified. However, HLA 1994 disagrees with the memorandum regarding statistical information for the storm drain system cited as PRC 1996c regarding the number of catchbasins and manholes present. The Navy does not know with certainty what the exact numbers are. Both sets of numbers were provided to indicate to the reader that there is some question regarding the exact statistical summary of storm drain features. The text now states that "The exact number of catchbasins and total length of storm drain are unknown." The construction summary report will document field conditions.

7. Comment: **Section 2.5, pg. 15, last paragraph: This assumption should be clarified to include the fact that offsite disposal also depends upon the type of contamination. The fact that small amounts of soil from other projects was disposed offsite does not necessarily mean that this action is appropriate or even applicable for the storm drains.**

Response: The assumption should have been more clearly stated to include the type of contamination as a criteria for off-site disposal. After reviewing the text in question it was felt to be an inappropriate conclusion and the paragraph was deleted.

8. Comment: **Table 1 is difficult to read because the difference between the bold and non-bold typeface is almost indistinguishable.**

Response: Type size has been varied in this table as well so that the difference between bold and non-bold (roman) typeface is more distinguishable.

9. Comment: **Table 3, pg. 29-33 and Section 3.3.2, pg. 45: The infiltration (exfiltration) rates vary dramatically. Please discuss the accuracy of this data and the significance of the variations.**

Response: The accuracy of measured flowrates may vary by as much as 15 percent. The variation seen in the table is not due to variation in accuracy of technique, but to other factors. Other factors include the size of line, integrity of line, material of construction of line, spacing between joints, cracks in the line, depth to groundwater, hydraulic gradient applied to the exterior of the line by the groundwater table, material of construction of the manhole or catchbasin, integrity of the manhole or catchbasin, and storage of tidal waters in soils at cracks and joints. The causes at any particular location are not known. However, the infiltration of groundwater has been removed from this EE/CA, as explained in the response to EPA general comment 1.

10. Comment: **Table 3: What level determines negligible?**

Response: This footnote is a descriptor for one reach where exfiltration, rather than infiltration, appears to be occurring. The footnote should have read "There is no infiltration of contaminated groundwater." However, the infiltration of contaminated groundwater has been removed from the scope of the removal action and therefore Table 3 has been deleted. Please refer to the response to EPA general comment 1 for further explanation.

11. Comment: **Table 3: The footnotes state that salinity levels for the Bay around the base vary from 11.2 to 12.5 percent. We understand that to mean equal to 112,000 to 125,000 ppm [parts per million] salinity. Isn't this range unusually high for seawater?**

Response: The salinity meter was interpreted as reading percent (%). However, the meter was actually reading parts per thousand (‰). However, the infiltration of contaminated groundwater has been removed from the scope of the removal action and therefore Table 3 has been deleted. Please refer to the response to EPA general comment 1 for further explanation.

12. Comment: **Table 4, pg. 36-37: The column headers include LER-L and LER-M. Please define these abbreviations in the footnotes.**

Response: The acronym is defined in the header of the column. A note has been added to the table explaining effects range. The acronyms have also been corrected to read ER-L and ER-M.

13. Comment: **Section 3.3.2, pg. 45, 4th paragraph: TCE is not tetrachloroethene.**

Response: The word tetrachloroethene should be changed to trichloroethene. However, the infiltration of contaminated groundwater has been removed from the scope of the removal action and therefore the text in question has been deleted. Please see EPA general comment 1 for further explanation.

14. Comment: **Table 6: Shows the screening criteria for DCE to be 224,000 μg/L [micrograms per liter], not 129 μg/L as indicated in this paragraph. Please resolve this discrepancy.**

Response: The screening criteria for DCE is 224,000 μg/L. The text should be corrected. However, the infiltration of contaminated groundwater has been removed from the scope of the removal action and therefore Table 6 has been deleted. Please refer to the response to EPA general comment 1 for further explanation.

15. Comment: **Section 3.3.1, pg. 38: Why is it necessary to further evaluate sediments in the EE/CA if they are going to be removed and disposed?**

Response: The sentence was meant to inform the reader that sediment data results would be discussed further in a later section of the EE/CA. The paragraph was deleted because it was confusing.

16. Comment: **Section 3.3.2, pg. 38: Where does the discussion of screening against Enclosed Bay and Estuary Plan criteria take place in this document?**

Screening criteria only serve the purpose of determining which contaminants pose a potential threat to the environment. They are not taken as clean-up standards, and do not have to result in a removal action.

Response: There was no screening against Enclosed Bay and Estuary Plan water quality objectives. However, a comparison with Enclosed Bay and Estuary Plan water quality objectives was provided. Please see the response to EPA general comment 5 for further explanation.

17. **Comment:** **Section 3.3.2, pg. 46, first paragraph: Activities such as groundwater/tidal influence modeling or tracer tests are needed to support the anticipation that contaminant concentrations at the outfall are significantly less than at the manholes.**

Response: Activities such as groundwater/tidal modeling or tracer tests are not felt to be needed because data regarding dilution of stormwater flow by infiltrating groundwater between manholes is more easily determined by collecting flow rate and contaminant concentration data at an upstream and downstream manhole. The text should have explained why volatile organic compound (VOC) contaminant concentrations at the outfall were anticipated to be significantly less than at manhole 261. This expanded text should have made the following points:

- According to the analysis contained in Appendix A of the draft EE/CA (infiltration study), the only reaches where VOC contamination was expected in drainage area I (drainage area I is shown on Figure 3 - draft EE/CA) was between manholes 199-268 and manholes 268-261 (shown on Figure 4 - draft EE/CA). Manhole 261 is downgradient of the other two manholes (199 and 268).

- The outfall of drainage area I is the 72-inch line.

- Flow at low tide leaving manhole 261 is 156 gpm. Salinity is 0.1 part per thousand (Table 3 - draft EE/CA) indicating that this flow is due to groundwater infiltration.

- Manhole 569 is the manhole furthest downstream in drainage area I where flow measurements were taken at low tide (Figure 4 - draft EE/CA). This manhole is located very near the 72-inch outfall.

- Flow at low tide from manhole 569 was 1647.9 gpm (Table 3 - draft EE/CA). Salinity was 8 parts per thousand indicating that this flow was predominantly due to tidal waters receding toward the bay (Bay water salinity is 11.2 to 12.5 parts per thousand).

- The 72-inch outfall was also observed half submerged in the bay during low tide.

- Based on the above data, VOC contaminant concentrations are anticipated to be reduced as follows at the outfall. Enclosed Bay and Estuary water quality objectives were provided for comparative purposes.

Analyte	Manhole 261	Manhole 569	Enclosed Bay and Estuary Plan Objective
1,2 Dichloroethene	55 μg/L	5 μg/L (Anticipated)	130 μg/L
Trichloroethene	140 μg/L	13 μg/L (Anticipated)	92 μg/L
Flowrate	261 gpm	1647.9 gpm	——

Dilution water is predominantly tidal water rather than infiltrating groundwater.

However, the scope of the EE/CA has been narrowed to include sediments only, so all of the above information will not be added. Please see the response to EPA general comment 1 for further explanation.

18. Comment: **Section 3.3.2, page 46, paragraph 4: The justification provided for excluding nickel, copper, and mercury from further consideration is inadequate. It is premature to dismiss these metals until concentrations of these metals in background groundwater have been established.**

Response: The Navy agrees that concentrations of metals in background groundwater need to be established. However, as stated in the first full paragraph on page 45 of the draft EE/CA, "Determination of background values is outside the scope of the EE/CA process and therefore should be done by others." Please see the response to EPA general comment 1 regarding the establishment of HGALs.

19. Comment: **Section 3.3.2, pg. 46, paragraph 5: The areas of concern must be reevaluated after the screening level issues are resolved.**

Response: Please see the response to specific comment 17. The areas of concern will be addressed after groundwater screening issues are resolved. Please see the response to EPA general comment 1 for further explanation regarding where groundwater screening issues will be resolved.

20. Comment: **Section 4.1, pg. 47, paragraph 3: Statements such as "unless strong evidence indicates inorganic compounds are related to activities conducted at HPA, inorganic compounds are not considered as part of this removal**

action" should be deleted from this document. Once a method of establishing background groundwater concentrations of metals has been agreed to, any necessary remedial action will have to be assessed.

Response: The determination of HGALs and the source of ambient levels of inorganic chemicals in the groundwater at HPS is beyond the scope of this EE/CA. Because of this and because the infiltration of contaminated groundwater has been removed from the scope of the removal action this statement has been deleted from the document. Please see the response to EPA general comment 1 and EPA specific comment 18 for further explanation.

21. Comment: **Table 7: The ARARs are incomplete. Since PCBs are present, TSCA [Toxic Substances Control Act] should be referenced. No ARARs for maintaining the water quality and ecological integrity of San Francisco Bay have been included, such as the Coastal Zone Management Act.**

Response: TSCA includes provisions for managing and cleaning up PCB wastes containing concentrations above 50 parts per million (ppm). Only one sediment sample, out of 78 total samples, exceeded this concentration. However, the possibility exists for concentrations to exceed 50 ppm in nonsampled areas so, TSCA will be added to Table 7 as an ARAR.

The selected removal action does not impact the coastal zone. The Navy believes the Coastal Zone Management Act is not an ARAR.

22. Comment: **Section 4.2, first and second bullet: These bullets demonstrate the confusion that exists over the purpose of screening criteria (see General Comment #5). The goal or objective of the removal action is not to prevent all contaminants above screening levels from reaching the Bay. The first bullet is not only based on an incorrect premise, but is misleading, because prior to implementation of the proposed monitoring program for the storm drain reaches, it is not yet known whether groundwater contains contaminants above screening levels, and there have been no measures yet proposed to prevent the groundwater from reaching the Bay through the storm drains.**

Response: The removal action objective has been changed to read as follows:

- Mitigate risk posed by contaminated sediments that may release directly to the bay or may serve as a source for contaminants that could desorb when in contact with water flowing through the system

The removal action will be compatible with future remedial actions planned at HPS.

23. Comment: **Section 4.3.2., pg. 48, last paragraph: The background information and discussion in this paragraph is not relevant to the understanding and support of alternatives presented in the EE/CA, and is inappropriate for inclusion in this document. Please delete the paragraph.**

Response: The paragraph has been deleted from the document.

24. **Comment:** **Section 4.3.2.3, pg. 52, first paragraph: Much of the discussion in this paragraph does not seem necessary, especially in view of the chosen alternative which recommends off-site disposal of the sediments. See General Comment #4 above.**

Response: This paragraph has been streamlined to generally explain hazardous waste identification requirements, whether for on-site or off-site management. Please see the response to EPA general comment 4.

25. **Comment:** **Section 4.3.2.3, pg. 52, second paragraph: Dilution of the TTLC leachate by a factor of 10 will not necessarily give the same result as the multiplication of the STLC number by the same factor. Provide justification, in the form of either regulatory agreement of such a precedent or guidance document, for using this approach. What is the justification for needing 10% of the samples to exceed the designated trigger level (10 x STLC) in order to consider the waste hazardous?**

Response: The paragraph states that analytical data were derived from the total analysis method, that is, no leachate extraction is involved. The total results should not be directly compared to soluble threshold limit concentrations (STLCs) since the method required in the regulations to determine STLCs is an extraction procedure that involves a 10-fold dilution of the sample. If all of a constituent leaches out of a solid sample during extraction, it will be diluted by 10 as part of the procedure. Therefore, comparing the total results to 10 times the STLC provides a conservative estimate of whether the sediments will exceed the hazardous levels when they are actually tested using the extraction method. The paragraph will be expanded to clarify the discussion.

The paragraph has been modified to explain that this data evaluation step is an estimate. The Navy believes that mixing will occur as part of the removal action and that it is reasonable to estimate that if less than 10 percent of the samples exceed a hazardous level, the final stock pile of material will not exceed hazardous limits. This estimation is made only for alternative comparison purposes. All material will be characterized using extraction and total analyses and managed appropriately.

26. **Comment:** **Section 4.3.2.3, pg. 53, second and third paragraphs: Why are "remedial activities" referenced in this removal action document?**

The CAMU ARARs may present some difficulties. Since this alternative was not the recommended one, EPA will not comment extensively on this approach. However, it will be subjected to much greater scrutiny should it be decided that Alternative 3 is the preferred option.

Response: The term "remedial action" has been replaced with the term "removal action."

Alternative 3, which includes disposal of storm drain sediment in an on-site corrective action management unit (CAMU), was not selected primarily because the administrative process for establishing a CAMU has not been started and will require a longer period of time than is available before this removal action will be implemented. The Navy understands that implementation of a CAMU at the proposed location (the IR1/21 landfill) will require a technical evaluation of the site to determine whether a CAMU is consistent with the final remedy as well as preparation of the appropriate administrative documentation, such as a Record of Decision, to establish the unit.

27. Comment: **Section 4.3.2.3, pg. 54, third, fourth and fifth paragraphs: The sediment is going to be removed from the catch basins for disposal purposes is therefore defined as being a solid waste. Sampling and analysis in accordance with RCRA [Resource Conservation and Recovery Act] Subtitle C and SWRCB regulations will be able to determine whether the waste is hazardous. (See general comment #4).**

Response: Please see the response to EPA general comment 4.

28. Comment: **Section 5.1, pg.55, second paragraph: How will the pressure washing of the lines be accomplished to ensure that no additional sediment or waste water is washed out to the Bay? Does ensuring complete capture of the sediments and water increase costs and has this aspect been factored into the costs of removing sediments and cleaning the drain line?**

Response: The outlet of the downstream manhole will be plugged to contain washwater and sediments. The following sentence has been added to the text, "Complete capture of sediments and wash water was factored into the cost opinion."

29. Comment: **Section 5.1, pg 55, last paragraph: Please explain how characterization will be accelerated and how the accelerated practice differs from standard practice.**

Response: Normal laboratory turnaround time is 30 days. The actual test run by the laboratory is not changed; however, the time to process of documentation is shortened.

30. Comment: **Section 5.2.1, pg. 56, paragraph 2: This section implies that metals are the only problem, which is incorrect. On page 46, it is stated that the presence of PCBs in reaches TB25-TB32 and TB32-TB18 will be addressed in this EE/CA. There are several listed organic contaminants in the sediments such as TCE that don't exceed ER-Ls but still may exceed LDRs and be prohibited for all sediments before off site disposal is selected. TCE, for instance, exceeds LDR standards in 40 CFR 268.43 and cannot be land disposed.**

Response: Several listed organic contaminants may exceed LDRs. After comparing data with universal treatment standards included in 40 CFR 268.48, the percentage of sediments exceeding LDRs for organic contaminants was estimated at 20 percent. There is a high degree of uncertainty regarding the exact percentage of sediments that will ultimately require treatment for organic constituents. Section 5.3.1 has been expanded to discuss the organic contaminant issue.

31. Comment: **Section 5.3.1, pg. 60: This section should include a discussion of LDRs for organic constituents which also exceed criteria. Treatment for these compounds is not generally performed at the disposal facility and would preclude this type of disposal.**

Response: Please see the response to EPA specific comment 30. Organic contamination exceeding LDR would need to be treated at an appropriate treatment facility.

32. Comment: **Section 5.3.1.1, pg. 61, paragraph 2: Sediments that are characteristic wastes should be sent off site unless the Navy is planning on constructing a RCRA TSD [treatment, storage, and disposal (facility)] onsite. The 2nd paragraph of section 5.3.1 also says hazardous sediments will be sent off site for disposal. This section should be rewritten to be consistent.**

Response: The Navy agrees that this option specifies disposal of sediments that exhibit a toxicity characteristic for hazardous waste at an off-site facility. However, the sentence in question is meant to address storage of sediment on-site prior to off-site shipment. The sentence has been revised as follows:

"Sediments containing constituents at levels that exceed toxicity characteristic criteria will be stored on-site in compliance with hazardous waste regulations."

33. Comment: **Section 5.3.1.3, pg. 61: Organic LDR wastes are not treated at landfills. The costs for this technology will be higher due to the presence of organics.**

Response: After reviewing the data and comparing them with universal treatment standards contained in 40 CFR 268.48, the Navy has estimated that 20 percent of sediments will need to be treated for organic contamination prior to disposal. The revised costs reflect this change.

34. Comment: **Section 5.3.2.1, pg. 62, first paragraph: Under this alternative sediment from the storm drains is disposed of in the landfill in Parcel E (IR-1/21) which is currently being recommended for a removal action. The Parcel E EE/CA and the recommended alternative for a removal action does not mention or address the consequences of disposing of storm drain sediment in IR-1/21. The removal action for Parcel E is based on the contaminants currently present in the landfill and is designed to be compatible with the final remedy for this site. Should the on-site landfill disposal/management alternative be chosen for the storm drain removal action, what measures will be taken to ensure that the presence of additional contaminants in the landfill will be addressed in the RI/FS? Has most of the field sampling for the RI been already completed and if so, when will additional sampling be undertaken to assess the additional contamination?**

Response: Most of the sampling for the remedial investigation (RI) has already been completed for IR-1/21. Implementation of the CAMU would require additional evaluation. The landfill is currently classified as a solid waste landfill. Designating the landfill as a CAMU means that the Navy would be able to add hazardous waste on top. The result is that closure requirements, including both the capping and groundwater monitoring, would change if a CAMU were implemented. Since this option was not selected, no schedule for additional sampling was developed. For further discussion of the implementability of a CAMU at IR-1/21, please refer to the response to EPA specific comment 26.

35. **Comment:** **Section 6.2.1, pg. 71: Please justify monitoring only reach TB25 to TB32 to PCBs. PCBs were also present in reach TB18 to TB32 (see pg. 46).**

Response: There were to be two reaches that were to be monitored for PCBs. These two reaches were to be reach TB25 to TB32 and TB32 to TB18. However, groundwater infiltrating into the storm drain system has been removed from the scope of the removal action. Therefore, this section has been deleted.

36. **Comment:** **Section 6.2.1.1, pg. 71: Monitoring does not protect the environment unless no contaminants are found. In any event, regardless of whether contamination is found or not, nothing will be done during the monitoring period. Therefore, overall protection may not be provided in the short term.**

Response: A removal action cannot be initiated unless an imminent threat is known. As the text indicates in the second paragraph on page 46, PCBs exceed screening criteria in samples from reaches TB25-TB32 and TB32-TB18. However, the data in Table 3 regarding infiltration rates for these two reaches shows that the infiltration rate for these two reaches is very small (1.4 and 0.6 gpm respectively. Further examination of the sediment data shows that sediment samples were collected at the upstream and downstream ends of the two combined reaches (See Figure 3). The upstream sediment sample also shows a PCB concentration of 15,000 μg/kg. Even though the solubility of PCB in water is very low, there is the possibility that PCBs detected in water in these reaches originates in the sediment, rather than infiltrating groundwater. Therefore, the Navy proposed to monitor the two reaches referenced above after the sediments had been removed. This point was not fully explained in Section 3.3.2 of the draft EE/CA. However, the scope of the removal action has been narrowed to encompass removal of sediment only. Please see the response to EPA general comment 1 for further explanation.

37. **Comment:** **Section 7 and 8: These alternatives should be reconsidered and reevaluated in light of the fact that there are land banned wastes present in the sediments. TCE and other compounds appear to exceed LDRs and would prevent the sediment from being disposed in a landfill.**

Response: After comparing data with universal treatment standards specified at 40 CFR 268.48, the projected percentage of sediments requiring treatment for organic constituents was estimated at 20 percent. There is a high degree of uncertainty regarding the exact percentage of sediments that will ultimately require treatment for organic chemicals. This uncertainty reinforces the choice of off-site disposal as the preferred option because of its increased flexibility to respond to field conditions. Section 5.3.1 has been expanded to discuss the organic contaminant issue.

APPENDIX B

1. Comment: **Table: No footnotes were provided to describe abbreviations and symbols.**

Response: An explanation of footnotes has been added to Appendix B.

APPENDIX C

1. Comment: **Alternative 1: Please explain why heavy duty line cleansing is presented in cubic yards in the alternative when the units in Alternative 2 for this task are presented in cubic feet.**

The lease cost of $270,000 to lease 10 rolloffs for 9 months seems high. This is similar to the costs for leasing a motorized piece of equipment such as an excavator, loader etc.

Response: The units presented for heavy duty line cleaning in Alternative 2 of cubic feet are incorrect; the actual units should be cubic yards. The numerical quantity presented and associated cost, however, are correct.

The lease cost for rolloffs was based on a vendor quote. The rolloff is specialized and is equipped for dewatering and decanting water from the sediments.

2. Comment: **All Alternatives: Please justify why video monitoring is only needed for 340 feet of storm drain. This justification should include a description of where video monitoring is planned.**

Response: The estimate for 340 feet of video monitoring was associated with the groundwater portion of the EE/CA, and will not be included in the revised EE/CA. The revised EE/CA cost opinions will include costs for video surveying of monitoring all storm drain lines before and after sediments are removed.

3. Comment: **Alternative 3: The labor estimate for installing a monitor well is presented in units and not hours. Why is the labor estimate in units?**

Response: The units provided for labor for monitoring well construction were readily available from previous well installations. Unit costs are an effective means of estimating costs.

4. Comment: **Although the cost estimates in Appendix C were generally well prepared, more details would allow for a better evaluation of the accuracy. Most of these costs appeared to be presented as a task unit cost or lump sum. The**

labor rates for sample collection and project management were difficult to evaluate without additional information.

Response: Because the cost opinions presented were primarily for comparative purposes, additional detail was not deemed necessary for the EE/CA. Lump sum figures were generally provided for equipment mobilization and demobilization costs, and are either based on vendor quote or Means Site Work & Landscape Cost Data.

COMMENTS FROM DTSC

General Comments

1. Comment: **In drafting this report, a special care must be given to the Executive Summary. The Executive Summary is a place to capture the essence of the report. Statement of concern, objective and means to meet the objective need to be articulated. Any ambiguity in the statement of concern and objective will invite unfavorable response.**

Response: Comment noted. The executive summary has been rewritten to more clearly state the objectives and conclusions of the report.

2. Comment: **There are conflicting and contradicting statements in this report. For example, the removal action consists of mitigating "discharge of contaminated sediments and infiltrated groundwater", however, the Navy only proposes to monitor the infiltrated groundwater. Monitoring infiltrated groundwater does not constitute a mitigation. If the removal action is "planned to mitigate discharge of contaminated sediments and infiltrated groundwater" into the Bay, it is not clear how this will reduce "risk" to the environment. There are major differences between the two. Monitoring the groundwater, as the selected alternative, is not consistent with the "planned removal action" nor the objective stated in the Executive Summary.**

Response: The EE/CA was not clear why monitoring was proposed as an option. As the text indicates in the second paragraph on page 46, PCBs exceed screening criteria in samples from reaches TB25-TB32 and TB32-TB18. However, the data in the table show that the infiltration rate for these two reaches is very small (1.4 and 0.6 gallons per minute [gpm], respectively). Further examination of the sediment data shows that sediment samples were collected at the upstream and downstream ends of the two combined reaches (See Figure 3). The upstream sediment sample also shows a PCB concentration of 15,000 μg/kg. Even though the solubility of PCBs in water is very low, there is the possibility that PCBs detected in water samples in these reaches originates in the sediment, rather than infiltrating the groundwater. Monitoring was proposed as an option so that an evaluation could be made regarding whether PCBs detected in base flows in the two reaches originated from infiltrating groundwater or PCBs in sediments. This point was not fully explained in Section 3.3.2 of the draft EE/CA. However, the scope of the removal action has been narrowed to encompass removal of sediment only. Please see the response to EPA general comment 1 for further explanation.

3. Comment: **Despite devoting a chapter to "Site Characterization", the above report does not explain the extent and nature of contamination. The extent of contamination in the entire length of storm drain system should be discussed. Without understanding the full extent and nature of contamination, drawing a conclusion is deemed to be pure speculative. As stated, the EE/CA "determined" the threat to the bay. However, we have been unable to identify where in the EE/CA that "threat" is "determined". Since, the storm drain has not been fully characterized, it is speculative to conclude that only infiltrating groundwater in a reach of the system poses a threat. It seems that there are multiple contaminants in both the sediments and infiltrated groundwater. The Navy has not discussed how monitoring a reach in the system will satisfy the objective of reducing the risk stated in the Executive Summary. This EE/CA should encompass the entire length of the storm system and thus a removal action should focus on the system as a whole.**

Response: The draft EE/CA does not state that only infiltrating groundwater in a specific reach of the system poses a threat. The two issues of sediment and groundwater were discussed separately because of the difference in potentially contaminated media. One discussion does not preempt the other. Appendix A (draft EE/CA) discusses the potential for contaminated groundwater infiltrating into the storm drain system.

Potential contamination of sediments was also discussed for the entire storm drain system. For instance, the fourth and fifth sentence in paragraph 3 of the executive summary (page ES-1 of the draft EE/CA) states that, "A sampling survey was conducted on storm drain system sediments in 1994. Sampling data indicated the presence of widespread sediment contamination in manholes and catchbasins throughout HPA."

The reference to "study area" in the first paragraph on page ES-2 of the draft EE/CA appears to have created some confusion regarding the extent of the HPA storm drain system that was evaluated. This reference, "Several metals were detected in water samples collected throughout the study area at concentrations exceeding screening levels;...", was meant to convey results for metals for samples collected in reaches likely to receive contaminated groundwater by way of infiltration. The infiltration study in Appendix A encompassed the entire storm drain system except reaches in Parcel A and evaluated which reaches were expected to receive contaminated groundwater by infiltration. Samples were then collected in these reaches for contaminants of concern, also identified in Appendix A of the Draft EE/CA.

However, the scope of the EE/CA has been reduced to include the removal of sediments only. Please see the response to EPA general comment 1 for further explanation.

The purpose of the monitoring program was unclear in the EE/CA. Please refer to the response to DTSC general comment 2 for an explanation why the monitoring program was proposed.

4. Comment: **There are too many criteria used to screen contaminants. These criteria are confusing, arbitrary and selective. For example, we have been able to identify "screening criteria", "applicable screening levels", "screening levels" and "selection levels" in the EE/CA. It is not clear how and for what purpose these criteria have been developed. It seems that these criteria have been used to limit the scope of the removal action.**

Response: Only three phrases should have been used. These are "sediment screening criteria," "groundwater screening criteria," and "inorganic selection levels." The document has been changed to use only the term "sediment screening criteria." This term describes the NOAA ER-M and ER-L values used for comparison with sediment analytical data. However, since the scope of the removal has been changed to no longer include infiltration of contaminated groundwater, all wording other than "sediment screening criteria" has been deleted. Please see the response to EPA general comment 1 for further explanation.

5. Comment: **It seems that the scope of removal action has focused only on "study area". It is not clear where this came from or how the Navy decided that only 68 reaches will be examined. The removal action must concentrate on the entire system to be comprehensive.**

Response: The 68 sediment sampling locations in Parcels B, C, D, and E are meant to be representative of the storm drain system, and these data have already been collected as part of previous investigations. In the case of sediments in the storm drain system, with periodic rains and tidal fluctuations disturbing the sediments, the Navy feels that the most effective way of characterizing the sediments is to remove the sediments and characterize them as they are removed — as was proposed in this EE/CA. The proposed removal action calls for the removal of all sediments, making it very comprehensive.

6. Comment: **The EE/CA is silence as to the issue of TPH [total petroleum hydrocarbon] contamination. Although, petroleum products are outside of CERCLA [Comprehensive Environmental Response, Compensation, and Liability Act], it must be addressed by the Navy. If the Navy would like to exclude the TPH contaminated sediments and infiltrating groundwater, it must point to an existing program that includes such contamination.**

Response: The intention of the EE/CA was to concentrate on the CERCLA hazardous constituents of TPH. Since the EE/CA calls for the removal of all sediments, any TPH contamination present will be addressed as this removal action is conducted. The infiltration of contaminated groundwater has been removed from the scope of this removal action. Please see the response to EPA general comment 1 for further explanation.

Specific Comments

7. Comment: **Section 1.1.,**

Page 3, paragraph 3, explain how NOAA [National Oceanic and Atmospheric Administration] criteria are used for this removal action.

Page 4, paragraph 1, "screening criteria were developed to indicate a potential for harmful impacts to the environment and justify the initiation of a removal action at the site". But on page 3, paragraph 4, screening criteria "were developed for the protection of aquatic life". It is not clear for what purpose the screening criteria have been developed.

Response: The use of NOAA criteria is explained on page 4, paragraph 1: "A potential impact exists if sediment contamination concentrations exceed the ER-L, ER-M, or background concentrations (for metals) ..."

NOAA states that screening values for sediment are for the purpose of protecting aquatic habitats. NOAA states further that screening values for water are for the protection of aquatic organisms. Since the scope of the EE/CA has been narrowed to include sediments only, the purpose of sediment screening criteria is the protection of aquatic habitat.

8. Comment: **Section 2. site characterization**

The information provided is fragmentary and limited. There is no explanation or approximation of the extent of the problem. The storm system is almost "107,000 linear feet" with numerous "manholes and catch basins". However, there is no discussion on how much of the line contains contaminated sediments or where contaminated groundwater enters the system. In addition, there has to be a thorough discussion on the integrity of the system to allow better understanding of the extent and source of contamination. It is assumed that there is extensive water infiltrating into the system through existing cracks. This section does not determine the extent of contamination as stated in the Executive summary.

Response: Please refer to the response to DTSC general comment 5 for a discussion of sediment sampling. Data provided in a letter report prepared by HLA and cited as HLA 1994 indicates that approximately 90 percent of sediments are in main and trunk lines. Remaining sediments are in manholes and catchbasins. This information has been added as the last sentence in Section 2.7 of the final EE/CA.

Almost all storm drain lines below the groundwater table allow a limited amount of infiltration through joints, manholes, and cracks in the pipe if they are present. The most expedient method of evaluating contaminated groundwater infiltration is to determine where lines are below the water table in areas where contamination is present and then sample this reach. This approach was used in the Infiltration Study Report that was included in Appendix A. Also, the scope of the removal action has been narrowed to include only sediments. Please see EPA general comment 1 for further explanation.

Unfortunately, very little of the system has been videotaped, so its integrity is largely unknown. The integrity of lines will be determined during the sediment removal portion of the removal action.

9. **Comment:** **Section 3.**

We have been unable to find any information related to risk evaluation in this section. Please explain how multiple contaminants in sediments and groundwater pose risk to aquatic organisms. It is important to note the "risk" is independent of "screening criteria". The discussion of screening criteria though useful is not linked to the "risk". And since the issue of "risk" is not explained, it is not clear how this removal action can satisfy the objective of reducing risk as stated in the Executive Summary.

Page 45, Paragraph 1, there is no substantiation of copper, lead, mercury, and zinc associated with serpentine. The Navy needs to provide references to support that position. Moveover, this paragraph, introduces "selection levels" for several metal without providing any information on their origin. In the absence of such explanation, we are unable to accept these values.

Information in paragraph 2 should be discussed in a different chapter that is more relevant. For example, the information in this paragraph is not related to the "streamline risk" evaluation. The discussion has more to do with the scope and selecting criteria.

Response: EPA Guidance On Conducting Non-Time-Critical Removal Actions Under CERCLA (EPA 1993) states that for a streamlined risk evaluation, "In some situations, exposure pathways can be identified as an obvious threat to human health or the environment by comparing EE/CA contaminant concentrations to standards that are potential chemical-specific applicable or relevant and appropriate requirements (ARARs) for the action. These may include non-zero Maximum Contaminant Level Goals (MCLGs) and Maximum Contaminant Levels (MCLs) for ground water or leachate..." "When potential ARARs for chemicals of concern do not exist for a specific contaminant, risk based chemical concentrations should be used." The streamlined risk assessment in this EE/CA was developed in accordance with this principle. Further discussion of the exact nature of the harmful effect is not necessary, and, is therefore not included.

As discussed in Section 3.3.1, ER-L screening guidelines (the word criteria has been changed to guidelines) are based on risk. They represent, as stated in Section 3.3.1, the low end of the range of concentrations at which detrimental effects to coastal resources and habitats were observed in studies.

Aquatic water quality criteria (AWQC) and basin plan water quality objectives also have their genesis in a risk evaluation conducted for the purpose of protecting aquatic life. This is stated in Section 3.3.2.

Hunters Point Ambient Levels (HPALs) were developed as background data for all soil types present at the base as stated in the text. HPALs were negotiated among and accepted by EPA, DTSC, RWQCB, and the Navy. HPALs include levels for lead, mercury, and zinc. The text will remain as is.

The reason for developing selection levels is provided in the first paragraph on page 45, and in the last paragraph of Section A.3.3 on Page A-4 (Appendix A). Selection levels were developed assuming that the data in Appendix A for the six metals in question represents a population. The population may include metals introduced by background and HPS activities. The selection level represents a value where one can be 95 percent confident that the metal in question is due to an activity other than background. The method, as acknowledged in the EE/CA, is not rigorous. However, the Navy must verify that removal actions are initiated for contamination that is a result of Navy activities and not levels of inorganic chemicals that are naturally occurring in the underlying geologic formations.

According to EPA guidance, another purpose of the streamlined risk evaluation is to identify chemicals of concern (COCs). Determination of COCs necessitates consideration of background concentrations in sediments in this section.

The three screening criteria that were used in the EE/CA were sediment screening criteria (please see the response to DTSC general comment 4 regarding terminology), groundwater screening criteria, and inorganic selection levels.

Sediment screening criteria is defined as ER-L or HPAL (background), whichever is greater. The scope of the removal action has been narrowed to include only sediments. Therefore, groundwater screening criteria and inorganic selection levels will not be discussed further in this EE/CA. Please see the response to EPA general comment 1 and DTSC general comment 4.

10. Comment: Section 4.1

This section states that the removal action is not meant to be final and an RI/FS [remedial investigation and feasibility study] will be completed for each of the parcels. However, in the Parcel B RI report, the Navy deferred the discussion of contamination in the storm drain to the removal action. Deferring action to RI/FS and

back to removal action is not going to address the problem of contamination in the system.

Response: The sentence referred to in Section 4.1 states that "The infiltration of contaminated groundwater portion of this removal action is not meant to be a final action for groundwater at HPA."

Section 4.15.7.2, Recommendations, of the Draft Parcel B RI states the following: "Based on the results of the investigations conducted in the storm drain system at IR-50, recommended remedial action objectives for the storm drain system at IR-50 may include:

- Cleanout storm drain system and dispose of sediment
- Eliminate infiltration of contaminated groundwater into the storm drain system

A removal action for IR-50 is proposed to address the foregoing remedial action objectives. Remedial action objectives will be evaluated during the Parcel B FS."

The draft RI states that there are certain objectives for the storm drain system, the removal action will address a portion of those objectives, and the remaining objectives will be handled during the Parcel B FS. Rather than deferring action, the Parcel B RI states that the FS will cover for any action not taken during the removal action.

As a result of the reduction in scope of the removal action to include sediments only, the Navy has added actions to the Draft Final Parcel B FS to address infiltration of contaminated groundwater into the storm drain system. Please refer to EPA general comment 1 and DTSC general comment 4 for further explanation regarding the reduction in scope and the disposition of contaminated infiltrating groundwater.

11. Comment: Section 4.2

The two objectives identified in the Executive Summary vary in scope to what is described in this section. For example, in this section it is stated that the objective of this removal action is to prevent contaminated groundwater and sediments "above screening criteria" from being discharged into the Bay. It seems that the emphasis has been placed on the "screening criteria" as an objective of the removal action. Whereas, in the Executive Summary the emphasis is on the "risk". It seems that there are not consistent objectives for this removal action. Further, "implementing a removal action" cannot be an objective of storm drain removal action.

Response: The removal action objective has been changed to read as follows.

- Mitigate risk posed by contaminated sediments that may release directly to the bay or may serve as a source for contaminants that could desorb when in contact with water flowing through the system

The removal action will be compatible with future remedial actions planned at HPS.

12. Comment: Section 4.3

The discussion and chronology of ARAR solicitation from the Department is not relevant to the storm drain EE/CA. The Letters from the Navy and the Department are both part of the administrative records. To reiterate our position, as it was stated in the meeting of 1/30/96, the Department responded appropriately to the letter received from the Navy. The Department has forwarded state ARARs on many occasions. Further, to assist the Navy, the Department hosted an ARAR meeting where several state departments and agencies participated.

Response: The Navy agrees that this paragraph is not relevant to the technical aspects of the removal action and removed it from the EE/CA.

13. Comment: Section 4.3.2.3.

The discussion of CAMU is very confusing. It is not clear if the Navy is proposing to designate an area as CAMU. The Health Safety Codes section 25200 explains conditions and situation when an area can be designated as a CAMU. The Health and Safety authorizes the Department to determine if an area can be designated as a CAMU. Since, the Department has not approved of any CAMU at Hunters Point. Any discussion of CAMU would only lead to confusion. And since there is no designated CAMU, LDRs must be considered for on-site and offsite disposal of contaminated materials.

Page 52, paragraph 2, the Department is not aware of any regulatory variance with respect to the percentage of samples for determining hazardous waste. If a sample exceeds STLC and TTLC, it is considered hazardous waste. This is true for wastes that are not listed. However, the Navy needs to establish that the sources to the contamination are unknown. The hazardous waste definition captured in Chapters 10, 11 and 12 of the Title 22 of the California Codes of Regulations should assist the Navy to that end.

Response: In a telephone conversation between DTSC and PRC on July 17, 1996, it was clarified that the EE/CA report does not indicate the complex nature of the CAMU approval process. To clarify this issue in the EE/CA report the following language has been added to Section 4.3.2.3.

"The CAMU approval process requires (1) the Navy to submit a proposal to DTSC for establishment of the unit, (2) DTSC to evaluate the proposal against criteria established in the regulations, and (3) the DTSC regional administrator to approve the CAMU. The Navy has not formally proposed establishment of a CAMU at HPS to date. However, the Navy may consider this option for future remediation activities at HPS.